JOURNAL

OF

BACTERIOLOGY

VOLUME 131

WASHINGTON, D C 20006

1977

JOURNAL OF BACTERIOLOGY

VOLUME 131 • 1977

EDITORIAL BOARD

L. Leon Campbell, Editor-in-Chief (1980)
University of Delaware, Newark

S. G. Bradley, Editor (1979)
Virginia Commonwealth University, Richmond

Allen T. Phillips, Editor (1980)
Pennsylvania State University, University Park, Pa.

Elizabeth McFall, Editor (1980)
New York University, New York, N.Y.

Carl Schnaitman, Editor (1978)
University of Virginia, Charlottesville

Donald P. Nierlich, Editor (1982)
University of California, Los Angeles

Simon Silver, Editor (1981)
Washington University, St. Louis, Mo.

Mark Achtman (1979)
James N. Adams (1979)
James Akagi (1979)
David Apirion (1979)
Arthur I. Aronson (1979)
Gad Avigad (1977)
Stephen D. Barbour (1979)
Richard S. Berk (1977)
Harriet Bernheimer (1977)
Judith S. Bond (1977)
Winfried Boos (1979)
H. D. Braymer (1979)
Jean Brenchley (1977)
George H. Brownell (1977)
Richard O. Burns (1977)
Peter J. Chapman (1979)
G. William Claus (1979)
Don B. Clewell (1977)
Stanely N. Cohen (1979)
Ronald S. Cole (1977)
S. F. Conti (1978)
Stephen Cooper (1978)
John E. Cronan, Jr. (1977)
Walter J. Dobrogosz (1979)
Patrick R. Dugan (1977)
A. Eisenstark (1979)
Alan D. Elbein (1979)
Wolfgang Epstein (1978)
David P. Fan (1978)
Walton L. Fangman (1978)
Gerald R. Fink (1978)
W. R. Finnerty (1979)
Harry E. Gilleland, Jr. (1979)
Walter R. Guild (1978)
Tadayo Hashimoto (1979)
Gerald L. Hazelbauer (1978)
George Hegeman (1977)
James A. Hoch (1977)
Joy Hochstadt (1977)
Bruce Holloway (1979)
Stanley C. Holt (1977)
Philip Hylemon (1979)
Robert J. Kadner (1979)
Sam Kaplan (1977)
Jost Kemper (1978)
David E. Kennel (1977)
Bruce C. Kline (1977)
Thomas G. Lessie (1979)
Robert L. Lester (1978)
Hillel S. Levinson (1978)
K. Brooks Low (1979)
Calvin S. McLaughlin (1978)
P. T. Magee (1977)
Michael H. Malamy (1978)
Manley Mandel (1978)
Robert E. Marquis (1979)
Neil H. Mendelson (1978)
Gene E. Michaels (1977)
Eugene W. Nester (1978)
John H. Nordin (1979)
Michio Oishi (1977)
Ronald H. Olsen (1978)
Sunil Palchaudhuri (1979)
Charles Panos (1978)
Leo Parks (1979)
Martin Pato (1978)
William S. Reznikoff (1979)
Palmer Rogers (1978)
Antonio H. Romano (1979)
Robert Rownd (1977)
Harold L. Sadoff (1977)
Milton H. Saier, Jr. (1979)
Gene A. Scarborough (1979)
Irwin H. Segel (1979)
Jane K. Setlow (1978)
J. A. Shapiro (1979)
Issar Smith (1978)
Lucile Smith (1978)
Dieter G. Soll (1979)
Dwight Stinnett (1979)
Robert L. Switzer (1979)
Bonnie M. Tyler (1978)
James A. Wechsler (1978)
David White (1977)
Clifford A. Woolfolk (1979)
Howard Zalkin (1979)

Robert A. Day, *Managing Editor*
Gisella Pollock, *Assistant Managing Editor*
Linda Illig, *Production Editor*
1913 I St., N. W., Washington, D. C. 20006

EX OFFICIO

A. Frederick Rasmussen, Jr., *President* (1977–1978)
J. Mehsen Joseph, *Secretary*

Edwin H. Lennette, *Vice-President* (1977–1978)
Brinton M. Miller, *Treasurer*

The *Journal of Bacteriology*, a publication of the American Society for Microbiology, 1913 I St., N.W., Washington, D.C. 20006, is devoted to the advancement and dissemination of fundamental knowledge concerning bacteria and other microorganisms. The *Journal* is published monthly, and the twelve numbers are divided into four volumes per year. The nonmember subscription price is $105 per year. Single copies are $9. The member subscription price is $21 per year. Correspondence relating to subscriptions, reprints, defective copies, availability of back issues, lost or late proofs, disposition of submitted manuscripts, and general editorial matters should be directed to the ASM Publications Office, 1913 I St., N.W., Washington, D.C. 20006 (area 202 833-9680).

Second class postage paid at Washington, D. C. 20006, and at additional mailing offices.
Made in the United States of America.

Copyright © 1977, American Society for Microbiology.
All Rights Reserved.

Volume 131

Contents for July

Number 1

Morphology and Ultrastructure

Composition and Synthesis of Cellular Lipids in *Neurospora crassa* During Cellular Differentiation. DAVID P. BECK AND J. W. GREENAWALT 188

Morphological Analysis of the Division Cycle of Two *Escherichia coli* Substrains During Slow Growth. C. L. WOLDRINGH,* M. A. DE JONG, W. VAN DEN BERG, AND L. KOPPES 270

Stalkless Mutants of *Caulobacter crescentus*. AKIO FUKUDA,* HIDEO IBA, AND YOSHIMI OKADA 280

Ultrastructural Surface Changes Associated with Dextran Synthesis by *Leuconostoc mesenteriodes*. B. E. BROOKER 288

Morphology and Ultrastructure of *Crenothrix polyspora* Cohn. H. VÖLKER, R. SCHWEISFURTH, AND P. HIRSCH* 306

Characterization of Bdellocysts of *Bdellovibrio* sp. JOHN J. TUDOR AND S. F. CONTI* 314

Ultrastructural Changes During Encystment and Germination of *Bdellovibrio* sp. JOHN J. TUDOR AND S. F. CONTI* 323

Caulobacter crescentus Pili: Structure and State-Specific Expression. CARL LAGENAUR AND NINA AGABIAN* 340

Genetics and Molecular Biology

Dying of Gamma-Irradiated *Escherichia coli* Studied by the Use of Prophage. DRAGO PETRANOVIĆ, VERA ZGAGA, AND ŽELJKO TRGOVČEVIĆ* 1

Control of Ribosome Synthesis in *Escherichia coli*: Analysis of an Energy Source Shift-Down. SØREN MOLIN,* KASPAR VON MEYENBURG, OLE MAALØE, MOGENS T. HANSEN, AND MARTIN L. PATO 7

Control of Protein Synthesis in *Escherichia coli*: Analysis of an Energy Source Shift-Down. KNUD JOHNSEN, SØREN MOLIN,* OLLE KARLSTRÖM, AND OLE MAALØE 18

Genetics of the *relB* Locus in *Escherichia coli*. BØRGE DIDERICHSEN,* NIELS P. FIIL, AND ROBERT LAVALLÉ 30

Fine-Structure Mapping and Complementation Analysis of the *Escherichia coli cysB* Gene. M. TULLY AND M. D. YUDKIN* 49

Genetic Basis of Vi Antigen Expression in *Salmonella paratyphi* C. NORMA J. SNELLINGS,* E. M. JOHNSON, AND L. S. BARON 57

Expression of R-Plasmid Functions During Anaerobic Growth of an *Escherichia coli* K-12 Host. LARS G. BURMAN 69

R-Plasmid Transfer and Its Response to Nalidixic Acid. LARS G. BURMAN 76

Characterization of Methylated Neutral Amino Acids from *Escherichia coli* Ribosomes. F. N. CHANG* AND CAROL BUDZILOWICZ 105

Regulation of L-Cystine Transport in *Salmonella typhimurium*. EDWARD W. BAPTIST AND NICHOLAS M. KREDICH* 111

Analysis of Genetic Recombination Between Two Partially Deleted Lactose Operons of *Escherichia coli* K-12. JANINE ZIEG AND SIDNEY R. KUSHNER* .. 123

Properties of the Relaxation Complex of Supercoiled Deoxyribonucleic Acid and Protein of R Plasmid NR1 in *Escherichia coli*. DAVID D. WOMBLE AND ROBERT H. ROWND* 145

Molecular Events Associated with Induction of Arginase in *Saccharomyces cerevisiae*. JUNE BOSSINGER AND TERRANCE G. COOPER* 163

* Asterisk refers to person to whom inquiries regarding the paper should be addressed.

Incompatibility and Surface Exclusion Properties of H_1 and H_2 Plasmids. DIANE E. TAYLOR* AND ROBERT B. GRANT 174

Effect of Transient Lambda Prophage Induction on Ultraviolet Light Resistance and Recombination in *Escherichia coli*. ANDREW BRAUN* AND DEBRA GLUCK 208

Metabolism of Arginine-Specific Messenger Ribonucleic Acid in *Escherichia coli* K-12. WILLIAM NATTER, DON SENS, AND ERIC JAMES* 214

Detection and Characterization of Plasmids in *Pseudomonas glycinea*. MICHAEL S. CURIALE AND DALLICE MILLS* 224

Messenger Ribonucleoprotein Complexes Isolated by Oligodeoxythymidylate-Cellulose Chromatography from *Neurospora crassa* Polysomes. PHILIP E. MIRKES 240

A Mutation (*gad*) Linked to *mt* and Affecting Asexual Plasmodium Formation in *Physarum polycephalum*. THOMAS M. SHINNICK AND CHARLES E. HOLT* . 247

Characterization of a Plasmid from *Streptomyces coelicolor* A3(2). HILDGUND SCHREMPF* AND WERNER GOEBEL 251

Composition and Molecular Weight of Pili Purified from *Pseudomonas aeruginosa* K. LAURA S. FROST AND W. PARANCHYCH* 259

Relationships Among Some R Plasmids Found in *Haemophilus influenzae*. LYNN P. ELWELL,* J. R. SAUNDERS, M. H. RICHMOND, AND STANLEY FALKOW .. 356

Gamma-Ray Sensitivity During Synchronous Cell Differentiation in *Caulobacter crescentus*. HIDEO IBA,* AKIO FUKUDA, AND YOSHIMI OKADA 369

Transformation of *Escherichia coli* and *Bacillus subtilis* with a Hybrid Plasmid Molecule. I. MAHLER* AND HARLYN O. HALVORSON 374

Physiology and Metabolism

Phototaxis and Membrane Potential in the Photosynthetic Bacterium *Rhodospirillum rubrum*. SHIGEAKI HARAYAMA* AND TETSUO IINO 34

Phthalate Metabolism in *Pseudomonas testosteroni*: Accumulation of 4,5-Dihydroxyphthalate by a Mutant Strain. TERUKO NAKAZAWA* AND EMIKO HAYASHI 42

Function of *S*-Adenosylmethionine in Germinating Yeast Ascospores. SUN-JIN CHOIH, ADOLPH J. FERRO,* AND STANLEY K. SHAPIRO 63

Metabolism of the Alkane Analogue *n*-Dioctyl Ether by *Acinetobacter* Species. M. C. MODRZAKOWSKI, R. A. MAKULA, AND W. R. FINNERTY* 92

Bacillus megaterium Mutant Deficient in Membrane-Bound Adenosine Triphosphatase Activity. S. J. DEKCER AND D. R. LANG* 98

Origin of the Heterogeneity of Cell Wall O-Polysaccharides from *Salmonella zuerich* [1,9,12,(46),27]. HOÀNG-OANH NGHIÊM AND ANNE-MARIE STAUB* 119

Evidence for the Presence of Phosphoriboisomerase and Ribulose-1,5-Diphosphate Carboxylase in Extracts of *Desulfovibrio vulgaris*. MARIA ALVAREZ AND LARRY L. BARTON* 133

Itaconate, an Isocitrate Lyase-Directed Inhibitor in *Pseudomonas indigofera*. B. A. MCFADDEN* AND S. PUROHIT 136

Inactivation and Partial Degradation of Phosphoribosylanthranilate Isomerase-Indoleglycerol Phosphate Synthetase in Nongrowing Cultures of *Escherichia coli*. RAYMOND D. MOSTELLER,* KAORU R. NISHIMOTO, AND RUTH V. GOLDSTEIN 153

Glucose Catabolism in Two Derivatives of a *Rhizobium japonicum* Strain Differing in Nitrogen-Fixing Efficiency. KALEMANI MULONGOY AND GERALD H. ELKAN* 179

Structural Analysis of the Surface Polysaccharide of *Staphylococcus aureus* M. DENG-FONG LIAU* AND JOHN H. HASH 194

Chemotaxis Toward Amino Acids by *Bdellovibrio bacteriovorus*. A. G. LAMARRE, S. C. STRALEY, AND S. F. CONTI* 201

Formation of Sugar Phosphates in Colicin K-Treated *Escherichia coli*. YOHTAROH TAKAGAKI,* MICHIO MATSUHASHI, JIMPEI YAMASHITA, AND TAKEKAZU HORIO 229

Temperature-Sensitive Cell Division Mutants of *Escherichia coli* with Thermolabile Penicillin-Binding Proteins. BRIAN G. SPRATT 293

Coordinate Regulation by Iron of the Synthesis of Phenolate Compounds and Three Outer Membrane Proteins in *Escherichia coli*. MARK A. MCINTOSH AND CHARLES F. EARHART* 331

Identification of Lipopolysaccharides and Phospholipids of *Escherichia coli* in Polyacrylamide Gels. STEPHEN C. BAILEY AND DAVID APIRION* 347

Mucopeptide Biosynthesis by Minicells of *Escherichia coli*. JOHN N. REEVE ... 363

Selenium Requirement for the Growth of *Clostridium sporogenes* with Glycine as the Oxidant in Stickland Reaction Systems. RALPH N. COSTILOW 366

Do Cytochromes Function as Oxygen Sensors in the Regulation of Nitrate Reductase Biosynthesis? C. H. MACGREGOR* AND C. W. BISHOP 372

Enzymology

Fructose 1,6-Diphosphate-Activated L-Lactate Dehydrogenase from *Streptococcus lactis*: Kinetic Properties and Factors Affecting Activation. V. L. CROW AND G. G. PRITCHARD* 82

Errata

Phosphoribulokinase from *Nitrobacter winogradskyi*: Activation by reduced Nicotinamide Adenine Dinucleotide and Inhibition by Pyridoxal Phosphate. LUTZ A. KIESOW, BENJAMIN F. LINDSLEY, AND JUERGEN W. BLESS 378

Escherichia coli Mutants Deficient in the Aspartate and Aromatic Amino Acid Aminotransferases. DAVID H. GELFAND AND ROBERT A. STEINBERG 378

Volume 131

Contents for August

Number 2

Morphology and Ultrastructure

Permeability of the Cell Envelope and Osmotic Behavior in *Saccharomyces cerevisiae*. WILFRED N. ARNOLD* AND JOHN S. LACY 564

Localization of Acid Phosphatase in *Saccharomyces cerevisiae*: a Clue to Cell Wall Formation. W. A. M. LINNEMANS,* P. BOER, AND P. F. ELBERS 638

Polyamines in Trypanosomatids. C. J. BACCHI,* GREGG Y. LIPSCHIK, AND HENRY C. NATHAN 657

Ultrastructure of Lipid Bodies in *Tilletia caries* Teliospores. JOHN S. GARDNER AND W. M. HESS* 662

Genetics and Molecular Biology

Porphyrin and Corrinoid Mutants of *Bacillus subtilis*. A. MICZÁK 379

Host Cell Reactivation of *Bacillus subtilis* Bacteriophages. E. FERRARI, A. G. SICCARDI, A. GALIZZI, J. CANOSI, AND G. MAZZA* 382

Mutations to Temperature Sensitivity in R Plasmid pSC101. TAMOTSU HASHIMOTO-GOTOH* AND MUTSUO SEKIGUCHI 405

Further Characterization of the F Fertility Inhibition Systems of "Unusual" Fin+ Plasmids. M. J. GASSON AND N. S. WILLETTS* 413

Suppression of an *Escherichia coli dnaA* Mutation by the Integrated R Factor R100.1: Origin of Chromosome Replication During Exponential Growth. M. CHANDLER,* L. SILVER, AND L. CARO 421

Isolation and Characterization of a *Bacillus subtilis* Mutant with a Defective *N*-Glycosidase Activity for Uracil-Containing Deoxyribonucleic Acid. FUMIKO MAKINO* AND NOBUO MUNAKATA 438

Viability of *Physarum polycephalum* Spores and Ploidy of Plasmodial Nuclei. THOMAS G. LAFFLER* AND WILLIAM F. DOVE 473

Chromosome Structure of *Escherichia coli* Mutants Temperature Sensitive for Deoxyribonucleic Acid Replication. RICHARD P. CUNNINGHAM* AND HILLARD BERGER 499

Mutants of Luminous Bacteria with an Altered Control of Luciferase Synthesis. C. A. WATERS AND J. W. HASTINGS* 519

Transfer of Chromosomal Genes Mediated by Plasmid R68.45 in *Rhodopseudomonas sphaeroides*. W. R. SISTROM 526

Molecular Characterization of Two Beta-Lactamase-Specifying Plasmids Isolated from *Neisseria gonorrhoeae*. MARILYN ROBERTS,* LYNN P. ELWELL, AND STANLEY FALKOW 557

Characterization of *lexB* Mutations in *Escherichia coli* K-12. PHILIPPE MORAND, MANUEL BLANCO,* AND RAYMOND DEVORET 572

Two Modes of Metabolic Regulation of Lysyl-Transfer Ribonucleic Acid Synthetase in *Escherichia coli* K-12. IRVIN N. HIRSHFIELD,* CATHERINE LIU, AND FU-MEEI YEH 589

Occurrence of a Class II Restriction Endonuclease in *Staphylococcus aureus*. ELLEN E. STOBBERINGH, ROEL SCHIPHOF, AND JOHN S. SUSSENBACH* 645

Secondary Promoter of the Guanine Operon of *Escherichia coli* K-12. YASUYUKI FUKUMAKI, KAZUNORI SHIMADA, AND YASUYUKI TAKAGI* 685

Influence of *rec* and *pol* Genes on the Maintenance of a *Proteus* Plasmid (P-*lac*) in *Escherichia coli*. R. E. AMBROSIO 689

Isolation and Characterization of Four Types of Plasmids from *Bacillus subtilis* (*natto*). TERUO TANAKA* AND TAKAKO KOSHIKAWA 699

Physiology and Metabolism

Oxalate, Formate, Formamide, and Methanol Metabolism in *Thiobacillus novellus*. T. S. CHANDRA AND Y. I. SHETHNA* 389

Effect of Light on *Bdellovibrio bacteriovorus*. DEVORAH FRIEDBERG 399

Induction of Alkaline Phosphatase in *Escherichia coli*: Effect of Procaine Hydrochloride. R. C. TRIBHUWAN AND D. S. PRADHAN* 431

Urease of *Klebsiella aerogenes*: Control of Its Synthesis by Glutamine Synthetase. BÄRBEL FRIEDRICH AND BORIS MAGASANIK* 446

Developmental-Stage-Dependent Adenine Transport in *Neurospora crassa*. LAKSHMI PENDYALA AND ANGELA M. WELLMAN* 453

Partial Purification of Ferredoxin from *Ruminococcus albus* and Its Role in Pyruvate Metabolism and Reduction of Nicotinamide Adenine Dinucleotide by H_2. T. L. GLASS, M. P. BRYANT, AND M. J. WOLIN* 463

Function of Cell Wall Teichoic Acid in Thermally Injured *Staphylococcus aureus*. DALLAS G. HOOVER AND RODNEY J. H. GRAY* 477

Characterization of Lysocardiolipin from *Acinetobacter* sp. HO1-N. R. E. TORREGROSSA, R. A. MAKULA AND W. R. FINNERTY* 486

Outer Membrane Phospholipase A from *Acinetobacter* sp. HO1-N. R. E. TORREGROSSA, R. A. MAKULA, AND W. R. FINNERTY* 493

Two Systems for the Uptake of Phosphate in *Escherichia coli*. H. ROSENBERG,* R. G. GERDES, AND KAYE CHEGWIDDEN 505

Restoration of Phosphate Transport by the Phosphate-Binding Protein in Spheroplasts of *Escherichia coli*. R. G. GERDES, K. P. STRICKLAND, AND H. ROSENBERG* 512

Fermentative Metabolism of Pyruvate by *Rhodospirillum rubrum* After Anaerobic Growth in Darkness. T. E. GORRELL AND R. L. UFFEN* 533

Source of Energy for Gliding Motility in *Flexibacter polymorphus*: Effects of Metabolic and Respiratory Inhibitors on Gliding Movement. HARRY F. RIDGWAY 544

Outer Membrane Proteins of *Escherichia coli*. V. Evidence that Protein I and Bacteriophage-Directed Protein 2 Are Different Polypeptides. DANA L. DIEDRICH, ANNE O. SUMMERS, AND CARL A. SCHNAITMAN* 598

Outer Membrane Proteins of *Escherichia coli*. VI. Protein Alteration in Bacteriophage-Resistant Mutants. PHILIP J. BASSFORD, JR., DANA L. DIEDRICH, CARL A. SCHNAITMAN,* AND PETER REEVES 608

Influence of Osmolarity of the Growth Medium on the Outer Membrane Protein Pattern of *Escherichia coli*. WIM VAN ALPHEN* AND BEN LUGTENBERG 623

Role of a Major Outer Membrane Protein in *Escherichia coli*. J. F. LUTKENHAUS 631

Photodynamic Induction of a Bacterial Cell Surface Polypeptide. J. KENNETH HOOBER 650

Purification and Properties of the Periplasmic Glucose-Binding Protein of *Pseudomonas aeruginosa*. M. W. STINSON,* M. A. COHEN, AND J. M. MERRICK 672

Regulation of the Arginine Dihydrolase Pathway in *Clostridium sporogenes*. V. VENUGOPAL AND G. B. NADKARNI* 693

Role of Cyclic Adenosine 3',5'-Monophosphate on Cessation of Respiration in Ultraviolet-Irradiated *Escherichia coli*. P. A. SWENSON,* R. L. SCHENLEY AND J. G. JOSHI 707

Release of Periplasmic Enzymes from *Escherichia coli* by Penicillin-Ethylenediaminetetraacetate Treatment. H. N. ANANTHASWAMY 710

Spore Coat Protein and Enterotoxin Synthesis in *Clostridium perfringens*. RONALD G. LABBE AND CHARLES L. DUNCAN* 713

Phosphoenolypyruvate:Sugar Phosphotransferase System in *Ancalomicrobium adetum*. MILTON H. SAIER, JR.* AND JAMES T. STALEY 716

Enzymology

Characterization of an Endonuclease Associated with the Drug Resistance Plasmid pKM101. DAVID LACKEY, GRAHAM C. WALKER, TERESA KENG, AND STUART LINN* 583

Conversion by Trypsin of Nonsense Suppressor-Produced Isozymes of Triosephosphate Isomerase to Isozymes Resembling the Wild Type. JAMES N. BAPTIST* AND SOBHENDRANATH DATTA 682

Enzymatic Reduction of Mercurous Ions in *Escherichia coli* Bearing R Factor. KAZOU IZAKI 696

Survey for α-(1 $\rightarrow$ 3)-Glucanase Activity Among Yeasts. MELVIN T. MEYER AND H. J. PHAFF* 702

Volume 131

Contents for September 1977

Number 3

Morphology and Ultrastructure

Relationship Between Cell Coiling and Motility of Spirochetes in Viscous Environments. E. P. GREENBERG AND E. CANALE-PAROLA* 960

Genetics and Molecular Biology

Killer Double-Stranded Ribonucleic Acid Synthesis in Cell Division Cycle Mutants of *Saccharomyces cerevisiae*. CHANNA SHALITIN* AND IRITH WEISER 735

Genetic Characterization of an *Escherichia coli* Mutant Altered in the Structure of Murein Lipoprotein. DANIEL W. YEM AND HENRY C. WU* 759

Inhibition and Facilitation of Transfer Among *Pseudomonas aeruginosa* R Plasmids. HITOSHI SAGAI, SHIZUKO IYOBE,* AND SUSUMU MITSUHASHI 765

Isolation, Genetic Analysis, and Characterization of *Escherichia coli* Mutants with Defects in the *lacY* Gene. ANN C. HOBSON, DJIM GHO, AND BENNO MÜLLER-HILL* 830

Isolation and Characterization of Specialized Lambda Transducing Bacteriophage Carrying the *metBJF* Methionine Gene Cluster. JAMES R. JOHNSON, RONALD C. GREENE,* AND JUDY HEILIG KRUEGER 795

Genetic Analysis of *Escherichia coli* K-12 Region I Flagellar Mutants. Y. KOMEDA, M. SILVERMAN, AND M. SIMON* 801

Major Proteins of the *Escherichia coli* Outer Cell Envelope Membrane as Bacteriophage Receptors. DIPAK B. DATTA, BERNHARD ARDEN, AND ULF HENNING* 821

Specific Alteration of the 30S Ribosomal Subunits of *Bacillus subtilis* During Sporulation. SIBAJYOTI GUHA AND JEKISIEL SZULMAJSTER* 866

Ribosomal Suppressors and Antisuppressors in *Podospora anserina*: Resistance to Cycloheximide. E. COPPIN-RAYNAL 876

Origin and Direction of Replication of the Drug Resistance Plasmid R100.1 and of a Resistance Transfer Factor Derivative in Synchronized Cultures. L. SILVER,* M. CHANDLER, E. BOY DE LA TOUR, AND L. CARO 929

Heteroduplex Analysis of *traΔ* F′ Plasmids and the Mechanism of Their Formation. MARK S. GUYER,* NORMAN DAVIDSON, AND ALVIN J. CLARK 970

Alteration of the *Bacillus subtilis* Glutamine Synthetase Results in Overproduction of the Enzyme. D. R. DEAN, J. A. HOCH, AND A. I. ARONSON* 981

Relationship Between Messenger Ribonucleic Acid and Enzyme Levels Specified by the Leucine Operon of *Escherichia coli* K-12. MICHELLE GALL DAVIS AND JOSEPH M. CALVO* 997

Induction of Colicin E1 Synthesis in Recombination-Defective Mutants in Both RecBC and RecF Pathways. ATSUSHI NAKAZAWA* AND NOBUO SUZUKI 1011

Selective Plasmid Transduction in *Bacillus pumilus*. MICHAEL G. BRAMUCCI AND PAUL S. LOVETT* 1029

Fine-Structure Mapping of the *firA* Gene, a Locus Involved in the Phenotypic Expression of Rifampin Resistance in *Escherichia coli*. RICHARD LATHE ... 1033

Physiology and Metabolism

Nitrogen Regulation of Arginase in *Neurospora crassa*. GERARDO VACA AND JAIME MORA* 719

Zeatin Ribonucleosides in the Transfer Ribonucleic Acid of *Rhizobium leguminosarum*, *Agrobacterium tumefaciens*, *Corynebacterium fascians*, and *Erwinia amylovora*. JOSEPH D. CHERAYIL AND MARIE N. LIPSETT* 741

Myxospore Coat Synthesis in *Myxococcus xanthus*: Enzymes Associated with Uridine 5′-Diphosphate *N*-Acetylgalactosamine Formation During Myxospore Development. D. FILER, S. H. KINDLER, AND E. ROSENBERG* 745

Myxospore Coat Synthesis in *Myxococcus xanthus*: In Vivo Incorporation of Acetate and Glycine. D. FILER, D. WHITE, S. H. KINDLER, AND E. ROSENBERG* 751

Induction of the Acetamidase of *Aspergillus nidulans* by Acetate Metabolism. M. J. HYNES 770

Modulation of Deoxyribonucleic Acid Polymerase III Level During the Life Cycle of *Bacillus subtilis*. GIOVANNI CIARROCCHI, CARMEN ATTOLINI,* FABIO COBIANCHI, SILVANO RIVA, AND ARTURO FALASCHI 776

Sodium Ion-Stimulated α-[1-^{14}C]aminoisobutyric Acid Uptake in Alkalophilic *Bacillus* Species. MAKIO KITADA* AND KOKI HORIKOSHI 784

Metabolism of 6-Aminonicotinic Acid in *Escherichia coli*. JOHN R. COBB, SUSAN C. PEARCY, AND R. K. GHOLSON* 789

Tetrapyrrole Utilization by *Bacteroides ruminicola*. DARRALYN R. MCCALL AND DANIEL R. CALDWELL* 809

Intracellular Localization of the Superoxide Dismutases of *Escherichia coli*: a Reevaluation. LARRY BRITTON AND IRWIN FRIDOVICH* 815

Allantoin Transport in *Saccharomyces cerevisiae*. ROBERTA SUMRADA AND TERRANCE G. COOPER* 839

Glutamate Transport Driven by an Electrochemical Gradient of Sodium Ions in *Escherichia coli*. TOMOFUSA TSUCHIYA,* SYED M. HASAN, AND JANE RAVEN 848

Cyclic Adenosine 3′,5′-Monophosphate Regulation of Membrane Energetics in *Escherichia coli*. STEVEN S. DILLS AND WALTER J. DOBROGOSZ* 854

myo-Inositol Transport System in *Pseudomonas putida*. GUIDO REBER, MONIQUE BELET, AND JACQUES DESHUSSES* 872

Regulation of the *Neurospora crassa* Assimilatory Nitrate Reductase. PAUL A. KETCHUM,* DEBORAH D. ZEEB, AND MARTHA S. OWENS 884

In Vitro Production of Bacitracin by Proteolysis of Vegetative *Bacillus licheniformis* Cell Protein. LJUBIŠA VITKOVIĆ AND HAROLD L. SADOFF* 897

Peptide Transport in Yeast: Utilization of Leucine- and Lysine-Containing Peptides by *Saccharomyces cerevisiae*. ROBERT MARDER, JEFFREY M. BECKER, AND FRED NAIDER* 906

Component from the Cell Surface of the Hydrocarbon-Utilizing Yeast *Candida tropicalis* with Possible Relation to Hydrocarbon Transport. O. KÄPPELI* AND A. FIECHTER 917

Hydrogenase Activity and the H_2-Fumarate Electron Transport System in *Bacteroides fragilis*. MARTHA A. HARRIS AND C. ADINARYAYANA REDDY* 922

Effect of Carbon Source and the Role of Cyclic Adenosine 3′,5′-Monophosphate on the *Caulobacter* Cell Cycle. NURITH KURN, LUCILLE SHAPRIO,* AND NINA AGABIAN 951

Antibody to the D-Alanine Carboxypeptidase of *Bacillus subtilis* Does Not Cross-React with Other Penicillin-Binding Proteins. CHRISTINE E. BUCHANAN,* JUDY HSIA, AND JACK L. STROMINGER. 1008

Inhibition of Thiamine Transport in *Saccharomyces cerevisiae* by Thiamine Disulfides. AKIO IWASHIMA,* YASUO WAKABAYASHI, AND YOSHITSUGU NOSE 1013

Variation in Guanosine 5′,3′-Tetraphosphate Levels in *Chromatium*. GRETCHEN KLAUSSMANN AND MARGARET MIOVIĆ* 1018

Propionate-Induced Synthesis of Odd-Chain-Length Fatty Acids by *Escherichia coli*. L. O. INGRAM,* L. S. CHEVALIER, E. J. GABBAY, K. D. LEY, AND K. WINTERS. 1023

Kinase Replacement by a Dehydrogenase for *Escherichia coli* Glycerol Utilization. E. J. St. Martin, W. B. Freedberg, and E. C. C. Lin* 1026

Enzymology

Purification and Properties of Beta-Lactamase from *Proteus morganii*. Yoshiaki Fujii-Kuriyama,* Mitsuyo Yamamoto, and Shinichi Sugawara 726

Purification of the Extracellular Protease of *Bacillus licheniformis* and Its Inhibition by Bacitracin. Ljubiša Vitković and H. L. Sadoff* 891

Threonyl-Transfer Ribonucleic Acid Synthetase from *Escherichia coli*: Subunit Structure and Genetic Analysis of the Structural Gene by Means of a Mutated Enzyme and of a Specialized Transducing Lambda Bacteriophage. H. Hennecke, A. Böck, J. Thomale, and G. Nass* 943

Mycoplasma Phosphoenolpyruvate-Dependent Sugar Phosphotransferase System: Purification and Characterization of Enzyme I. Abul H. Jaffor Ullah and Vicent P. Cirillo* 988

Comparison of Two Dioxygenases from *Pseudomonas putida*. Yao-Ling T. Lee and Stanely Dagley* 1016

Characterization of Antiserum Directed Against Form II Ribulose 1,5-Bisphosphate Carboxylase from *Rhodopseudomonas sphaeroides*. Janet L. Gibson and F. Robert Tabita* 1020

Erratum

Synthesis of R-Plasmid-Coded β-Lactamase in Minicells and in an In Vitro System. June N. Grindley, Richard Blumberg, and Dai Nakada 1037

AUTHOR INDEX

VOLUME 131

Agabian, Nina, 340, 951
Alvarez, Maria, 133
Ambrosio, R. E., 689
Ananthaswamy, H. N., 710
Apirion, David, 347
Arden, Bernhard, 821
Arnold, Wilfred N., 564
Aronson, A. I., 0000
Attolini, Carmen, 776

Bacchi, C. J., 657
Bailey, Stephen C., 347
Baptist, Edward W., 111
Baptist, James N., 682
Baron, L. S., 57
Barton, Larry L., 133
Bassford, Philip J., Jr., 608
Beck, David P., 188
Becker, Jeffrey M., 906
Belet, Monique, 872
Berger, Hillard, 499
Bishop, C. W., 372
Blanco, Manuel, 572
Böck, A., 943
Boer, P., 638
Bossinger, June, 163
Boy de la Tour, E., 929
Bramucci, Michael G., 1029
Braun, Andrew, 208
Britton, Larry, 815
Brooker, B. E., 288
Bryant, M. P., 463
Buchanan, Christine E., 1008
Budzilowicz, Carol, 105
Burman, Lars G., 69, 76

Caldwell, Daniel R., 809
Calvo, Joseph M., 997
Canale-Parola, E., 960
Canosi, U., 382
Caro, L., 421, 929
Chandler, M., 421, 929
Chandra, T. S., 389
Chang, F. N., 105
Chegwidden, Kaye, 505
Cherayil, Joseph D., 741
Chevalier, L. S., 1023
Choih, Sun-Jin, 63
Ciarrocchi, Giovanni, 776
Cirillo, Vincent P., 988
Clark, Alvin J., 970
Cobb, John R., 789
Cobianchi, Fabio, 776
Cohen, M. A., 672
Conti, S. F., 201, 314, 323
Cooper, Terrance G., 163, 839
Coppin-Raynal, E., 876
Costilow, Ralph N., 366
Crow, V. L., 82
Cunningham, Richard P., 499
Curiale, Michael S., 224

Dagley, Stanley, 1016
Datta, Dipak B., 821
Datta, Sobhendranath, 682
Davidson, Norman, 970
Davis, Michelle Gall, 997
Dean, D. R., 981
Decker, S. J., 98
de Jong, M. A., 270
Deshusses, Jacques, 872
Devorte, Raymond, 572
Diderichsen, Børge, 30
Diedrich, Dana L., 598, 608
Dills, Steven S., 854
Dobrogosz, Walter J., 854
Dove, William F., 473
Duncan, Charles L., 713

Earhart, Charles F., 331
Elbers, P. F., 638
Elkan, Gerald H., 179
Elwell, Lynn P., 356, 557

Falaschi, Arturo, 776
Falkow, Stanley, 356, 557
Ferrari, E., 382
Ferro, Adolph J., 63
Fiechter, A., 0000
Fiil, Niels P., 30
Filer, D., 000, 000
Finnerty, W. R., 92, 486, 493
Freedberg, W. B., 0000
Fridovich, Irwin, 0000
Friedberg, Devorah, 399
Friedrich, Bärbel, 446
Frost, Laura S., 259
Fujii-Kuriyama, Yoshiaki, 726
Fukuda, Akio, 280, 369
Fukumaki, Yasuyuki, 685

Gabbay, E. J., 1023
Galizzi, A., 382
Gardner, John S., 662
Gasson, M. J., 413
Gerdes, R. G., 505, 512
Gho, Djim, 830
Gholson, R. K., 789
Gibson, Janet L., 1020
Glass, T. L., 463
Gluck, Debra, 208
Goebel, Werner, 251
Goldstein, Ruth V., 153
Gorrell, T. E., 533
Grant, Robert B., 174
Gray, Rodney J. H., 477
Greenawalt, J. W., 188
Greenberg, E. P., 960
Greene, Ronald C., 795
Guha, Sibajyoti, 866
Guyer, Mark S., 970

Halvorson, Harlyn O., 374
Hansen, Mogens T., 7
Harayama, Shigeaki, 34
Harris, Martha A., 922
Hasan, Syed M., 848
Hash, John H., 194
Hashimoto-Gotoh, Tamotsu, 405
Hastings, J. W., 519
Hayashi, Emiko, 42
Hennecke, H., 943
Henning, Ulf, 821
Hess, W. M., 662
Hirsch, P., 306
Hirshfield, Irvin N., 589
Hobson, Ann C., 830
Hoch, J. A., 981
Holt, Charles E., 247
Hoober, J. Kenneth, 650
Hoover, Dallas G., 477
Horikoshi, Koki, 784
Horio, Takekazu, 229
Hsia, Judy, 1008
Hynes, M. J., 770

Iba, Hideo, 280, 369
Iino, Tetsuo, 34
Ingram, L. O., 1023
Iwashima, Akio, 1013
Iyobe, Shizuko, 765
Izaki, Kazuo, 696

James, Eric, 214
Johnsen, Knud, 18
Johnson, E. M., 57
Johnson, James R., 795
Joshi, J. G., 707

Käppeli, O., 917
Karlström, Olle, 18
Keng, Teresa, 583
Ketchum, Paul A., 884
Kindler, S. H., 745, 751
Kitada, Makio, 784
Klaussmann, Gretchen, 1018
Komeda, Y., 801
Koppes, L., 270
Koshikawa, Takako, 699
Kredich, Nicholas M., 111
Krueger, Judy Heilig, 795
Kurn, Nurith, 951
Kushner, Sidney R., 123

Labbe, Ronald G., 713
Lackey, David, 583
Lacy, John S., 564
Laffler, Thomas G., 473
Lagenaur, Carl, 340
LaMarre, A. G., 201
Lang, D. R., 98
Lathe, Richard, 1033
Lavallé, Robert, 30
Lee, Yao-Ling T., 1016
Ley, K. D., 1023
Liau, Deng-Fong, 194
Lin, E. C. C., 1026
Linn, Stuart, 583
Linnemans, W. A. M., 638
Lipschik, Gregg Y., 657
Lipsett, Marie N., 741
Liu, Catherine, 589
Lovett, Paul S., 1029
Lugtenberg, Ben, 623
Lutkenhaus, J. F., 631

Maaløe, Ole, 7, 18
McCall, Darralyn R., 809
McFadden, B. A., 136
MacGregor, C. H., 372
McIntosh, Mark A., 331
Magasanik, Boris, 446
Mahler, I., 374
Makino, Fumiko, 438
Makula, R. A., 92, 486, 493
Marder, Robert, 906
Matsuhashi, Michio, 229
Mazza, G., 382
Merrick, J. M., 672
Meyer, Melvin T., 702
Miczák, A., 379
Mills, Dallice, 224
Miović, Margaret, 1018
Mirkes, Philip E., 240
Mitsuhashi, Susumu, 765
Modrzakowski, M. C., 92
Molin, Søren, 7, 18
Mora, Jaime, 719
Morand, Philippe, 572
Mosteller, Raymond D., 153
Müller-Hill, Benno, 830
Mulongoy, Kalemani, 179
Munakata, Nobuo, 438

Nadkarni, G. B., 693
Naider, Fred, 906
Nakazawa, Atsushi, 1011
Nakazawa, Teruko, 42
Nass, G., 943
Nathan, Henry C., 657
Natter, William, 214
Nghiêm, Hoàng-Oanh, 119
Nishimoto, Kaoru R., 153
Nose, Yoshitsugu, 1013

Owens, Martha S., 884
Okada, Yoshimi, 280, 369

Paranchych, W., 259
Pato, Martin L., 7
Pearcy, Susan C., 789
Pendyala, Lakshmi, 453
Petranović, Drago, 1
Phaff, H. J., 702
Pradhan, D. S., 431
Pritchard, G. G., 82
Purohit, S., 136

Raven, Jane, 848
Reber, Guido, 872
Reddy, C. Adinaryayana, 922
Reeve, John N., 363
Reeves, Peter, 608
Richmond, M. H., 356
Ridgway, Harry F., 544
Riva, Silvano, 776
Roberts, Marilyn, 557
Rosenberg, E., 745, 751
Rosenberg, H., 505, 512
Rownd, Robert H., 145

Sadoff, H. L., 891, 897
Sagai, Hitoshi, 765
Saier, Milton H., Jr., 716
St. Martin, E. J., 1026
Saunders, J. R., 356
Schenley, R. L., 707
Schiphof, Roel, 645
Schnaitman, Carl A., 598, 608
Schrempf, Hildgund, 251
Schweisfurth, R., 306
Sekiguchi, Mutsuo, 405
Sens, Don, 214
Shalitin, Channa, 735
Shapiro, Lucille, 951
Shapiro, Stanley K., 63
Shethna, Y. I., 389
Shimada, Kazunori, 685
Shinnick, Thomas M., 247
Siccardi, A. G., 382
Silver, L., 421, 929
Silverman, M., 801
Simon, M., 801
Sistrom, W. R., 526
Snellings, Norma J., 57
Spratt, Brian G., 293
Staley, James T., 716
Staub, Anne-Marie, 119
Stinson, M. W., 672
Stobberingh, Ellen E., 645
Straley, S. C., 201
Strickland, K. P., 512
Strominger, Jack L., 1008
Sugawara, Shinichi, 726
Summers, Anne O., 598
Sumrada, Roberta, 839
Sussenbach, John S., 645
Suzuki, Nobuo, 1011
Swenson, P. A., 707
Szulmajster, Jekisiel, 866

Tabita, F. Robert, 1020
Takagaki, Yohtaroh, 229
Takagi, Yasuyuki, 685
Tanaka, Teruo, 699
Taylor, Diane E., 174
Thomale, J., 943
Torregrossa, R. E., 486, 493
Trgovčević, Željko, 1
Tribhuwan, R. C., 431
Tsuchiya, Tomofusa, 848
Tudor, John J., 314, 323
Tully, M., 49

Uffen, R. L., 533
Ullah, Abul H. Jaffor, 988

Vaca, Gerardo, 719
van Alphen, Wim, 623
van den Berg, W., 270
Venugopal, V., 693
Vitković, Ljubiša, 891, 897
Völker, H., 306
von Meyenburg, Kaspar, 7

Wakabayashi, Yasuo, 1013
Walker, Graham C., 583
Waters, C. A., 519
Weiser, Irith, 735
Wellman, Angela M., 453
White, D., 751
Willetts, N. S., 413
Winters, K., 1023
Woldringh, C. L., 270
Wolin, M. J., 463
Womble, David D., 145
Wu, Henry C., 759

Yamamoto, Mitsuyo, 726
Yamashita, Jimpei, 229
Yem, Daniel W., 759
Yeh, Fu-Mei, 589
Yudkin, M. D., 49

Zeeb, Deborah D., 884
Zgaga, Vera, 1
Zieg, Janine, 123

SUBJECT INDEX

VOLUME 131

Acetamidase induction
  A. nidulans acetate metabolism, 770
Acetate incorporation
  myxospore coat synthesis, 751
Acetate metabolism
  acetamidase induction, 770
  A. nidulans, 770
Acid phosphatase
  S. cerevisiae cell wall formation, 638
Acinetobacter
  n-dioctyl ether, 92
Acinetobacter sp. HO1-N
  cardiolipin phospholipase A, 493
  lysocardiolipin, 486
Adenine transport
  N. crassa, 453
Adenosine triphosphatase activity
  B. megaterium mutant, 98
S-adenosylmethionine
  germinating yeast ascospores, 63
Agrobacterium tumefaciens
  zeatins in tRNA, 741
D-Alanine carboxypeptidase
  antibody does not cross-react with other penicillin-binding proteins, 1008
  B. subtilis, 1008
Alkaline phosphatase induction
  E. coli, 431
  procaine hydrochloride, 431
Alkane-binding surface component
  C. tropicalis, 917
Allantoin transport
  S. cerevisiae, 839
Amino acids
  B. bacteriovorus chemotaxis, 201
  E. coli ribosomes, 105
6-Aminoicotinic acid metabolism
  E. coli, 789
α-Aminoisobutyric acid uptake
  Bacillus, 784
  sodium ion stimulation, 784
Anaerobic growth
  E. coli, 69
  R-plasmids, 69
Ancalomicrobium adetum
  PEP:sugar PTS, 716
Arginase
  N. crassa nitrogen regulation, 719
  S. cerevisiae, induction in, 163
Arginine dihydrolase pathway
  C. sporogenes, 693
Arginine-specific messenger ribonucleic acid
  E. coli, metabolism in, 214
Ascospores
  S-adenosylmethionine, 63
Aspergillus nidulans
  acetamidase induction, 770
Bacillus
  α-aminoisobutyric acid uptake, 784
  sodium ions, 784
Bacillus licheniformis
  bacitracin, 891, 897
  extracellular protease, 891
  proteolysis of cell protein, 897
Bacillus megaterium
  mutant deficient in adenosine triphosphatase activity, 98
Bacillus pumilus
  plasmid transduction, 1029
Bacillus subtilis
  D-alanine carboxypeptidase, 1008
  antibody to D-alanine carboxypeptidase, 1008
  corrinoid mutants, 379
  DNA polymerase III level, 776
  glutamine synthetase overproduction, 981
  N-glycosidase activity, mutant for, 438
  hybrid plasmid, transformation with, 374
  nonsense suppressor isozymes, 682
  plasmid, transformation with, 374
  porphyrin mutants, 379
  reactivation of phages, 382
  ribosomal alteration during sporulation, 866
  transformation with hybrid plasmids, 374
  triosephosphate isomerase isozyme synthesis, 682
Bacillus subtilis (*natto*)
  plasmids, 699
Bacitracin
  B. licheniformis, 891, 897
  host cell reactivation, 382
Bacteriophage
  B. subtilis, 382
Bacteriophage lambda
  metBJF cluster, 795
Bacteriophage receptors
  E. coli, 821
  proteins, 821
Bacteroides fragilis
  H_2-fumarate electron transport system, 922
Bacteroides ruminicola
  tetrapyrrole utilization, 809
Bdellovibrio bacteriovorus
  chemotaxis toward amino acids, 201
  effect of light, 399
Bdellovibrio bdellocysts, 314
Bdellovibrio sp.
  bdellocysts, 314
  encystment, 323
  germination, 323
Beneckea harveyi mutants
  luciferase synthesis, 519
Beta-lactamase
  P. morganii, 726
Beta-lactamase-specifying plasmids
  N. gonorrhoeae, 557

Candida tropicalis
alkane-binding surface component, 917
Carbon source
Caulobacter cell cycle, 951
Cardiolipin phospholipase A
Acinetobacter sp. HO1-N, 493
Caulobacter cell cycle
carbon source, 951
cAMP, 951
Caulobacter crescentus
gamma-ray sensitivity, 369
pili, 340
stalkless mutants, 280
Cell division mutants
E. coli, 293
penicillin-binding proteins, 293
Cell envelope permeability
S. cerevisiae, 564
Cell wall formation
acid phosphatase, 638
S. cerevisiae, 638
Cell wall O-polysaccharides
S. zuerich, 119
Cell wall teichoic acid
S. aureus, 477
Chemotaxis toward amino acids
B. bacteriovorus, 201
Chlamydomonas reinhardtii
photodynamic induction of a polypeptide, 650
Chromatium
ppGpp levels, 1018
Class II restriction endonuclease
S. aureus, 645
Clostridium perfringens
enterotoxin synthesis, 713
spore coat protein synthesis, 713
Clostridium sporogenes
arginine dihydrolase pathway, 693
selenium requirement, 366
Stickland reaction systems, 366
Coiling and motility
spirochetes in viscous environments, 960
Colicin E1 synthesis
mutants defective in RecBC and RecF pathways, 1011
Colicin K
sugar phosphate formation in *E. coli*, 229
Corrinoid mutants
B. subtilis, 379
Corynebacterium fascians
zeatins in tRNA, 741
Crenothrix polyspora Cohn
morphology and ultrastructure, 306
Crithidia fasciculata polyamines, 657
Cryptococcus
α-(1 → 3)-glucanase activity, 702
Cyclic adenosine 3′,5′-monophosphate
Caulobacter cell cycle, 951
E. coli membrane energetics, 854
E. coli respiration, 707
Cycloheximide resistance
P. anserina ribosomal suppressors, 876
cysB
E. coli, 49
mapping and complementation analysis, 49
L-Cystine transport
S. typhimurium, 111
Cytochromes
as oxygen sensors, 372
E. coli, 372
nitrate reductase biosynthesis, 372

Dehydrogenase
E. coli glycerol utilization, 1026
replacement of kinase, 1026
Deoxyribonucleic acid
gamma-irradiated *E. coli*, 1
Deoxyribonucleic acid polymerase III
B. subtilis, 776
Desulfovibrio vulgaris
phosphoriboisomerase, 133
ribulose-1,5-diphosphate carboxylase, 133
Dextran synthesis
surface changes in *L. mesenteroides*, 288
4,5-Dihydroxyphthalate accumulation
P. testosteroni, 42
n-Dioctyl ether
Acinetobacter species, 92
Dioxygenases
P. putida, 1016
Division cycle
E. coli, slow growth of, 270
dnaA mutation
E. coli, 421
suppression of, 421

Encystment
Bdellovibrio sp., 323
Endomyces
α-(1 → 3)-glucanase activity, 702
Endonuclease
plasmid pKM101, 583
S. aureus, 645
S. typhimurium, 583
Enterotoxin synthesis
C. perfringens, 713
Enzyme I
mycoplasma, 988
Erwinia amylovora
zeatins in tRNA, 741
Escherichia coli
alkaline phosphatase induction, 431
amino acids in ribosomes, 105
6-aminoicotinic acid metabolism, 789
anaerobic growth, 69
arginine-specific mRNA, 214
cAMP, 854
cAMP and respiration, 707
cell division mutants, 293
cell envelope membrane, 821
chromosome replication, origin of, 421
colicin K treatment, 229
cysB, 49
cytochromes as oxygen sensors, 372
dehydrogenase replaces kinase, 1026
division cycle during slow growth, 270
dnaA mutation, suppression of, 421
DNA in γ-irradiated cells, 1
dna(Ts) mutants, 499
dying of γ-irradiated cells, 1

energy source shift-down, 18
fatty acid, odd-chain-length, 1023
fertility inhibition systems, 413
firA, 1033
flagellar mutants, 801
gamma irradiation, 1
glutamate transport, 848
glycerol utilization, 1026
guanine operon, 685
hybrid plasmid, transformation with, 374
iron transport components, 331
kinase replaced by dehydrogenase, 1026
lactose operons, 123
lacY mutants, 830
leu operon, 997
lexB mutations, 572
lysyl-tRNA synthetase regulation, 589
membrane energetics, 854
mercurous ion reduction, 696
methylated amino acids in ribosomes, 105
minicells, 363
mplA locus, 758
mRNA, 214
mRNA and enzymes specified by *leu* operon, 997
mucopeptide biosynthesis by minicells, 363
murein lipoprotein, 758
nalidixic acid, 76
nitrate reductase biosynthesis, 372
odd-chain-length fatty acids, 1023
osmolarity of growth medium, 623
outer membrane proteins, 331, 598, 608, 623, 631
oxygen sensors, 372
penicillin-binding proteins, 293
penicillin-EDTA treatment, 710
periplasmic enzy... release, 710
phage receptors, 6...
phenolate compounds, synthesis of, 331
phosphate uptake, 505, 512
phosphoribosylanthranilate isomerase-indole-glycerol phosphate synthetase, 153
P-*lac* maintenance, 689
plasmid NR1, 145
plasmid R100.1, 929
plasmid, transformation with, 374
pol influence on P-*lac*, 689
procaine hydrochloride, 431
promoter of the guanine operon, 685
propionate, 1023
protein 1 mutants, 608
proteins 1 and 2, 598
proteins as phage receptors, 821
protein synthesis during shift-down, 18
Proteus plasmid (P-*lac*), 689
rec influence on P-*lac*, 689
recombination, 208
recombination between partially deleted lactose operons, 123
region I flagellar mutants, 801
relaxation complex of plasmid NR1, 145
relB, 30
resistance transfer factor, 929
respiration, 707
R factor R100.1, 421
ribosomes, 105
ribosome synthesis, 7
rifampin resistance, 1033
R plasmid NR1, 145
R-plasmids, 69, 76
shift-down, 7, 18
slow growth, 270
sodium ion-driven glutamate transport, 848
superoxide dismutase location, 815
sugar phosphate formation, 229
threonyl-tRNA synthetase, 943
transformation with hybrid plasmids, 374
transient λ prophage induction, 208
UV light resistance, 208

Fatty acids, odd-chain-length
E. coli, 1023
propionate, 1023
Ferredoxin
NAD reduction, 463
pyruvate metabolism, 463
R. albus, 463
Fertility systems, unusual, 413
Fin$^+$ plasmids
fertility inhibition systems, 413
firA
E. coli, 1033
Flagellar mutants
E. coli, 801
Flexibacter polymorphus
gliding motility, 544
Formamide metabolism
T. novellus, 389
Formate metabolism
T. novellus, 389

gad mutation
P. polycephalum, 247
Gamma irradiation
E. coli, 1
Gamma-ray sensitivity
C. crescentus cell differentiation, 369
Germination
Bdellovibrio sp., 323
Gliding motility
energy source, 544
F. polymorphus, 544
α-(1 → 3)-Glucanase activity
Cryptococcus, 702
Endomyces, 702
Rhodotorula, 702
Glucose-binding protein
P. aeruginosa, 672
Glucose catabolism
R. japonicum isolates, 179
Glutamate transport
E. coli, 848
sodium ions, driven by, 848
Glutamine synthetase
K. aerogenes urease synthesis, 446
overproduction in *B. subtilis*, 981
Glycerol utilization
E. coli, 1026
kinase replaced by dehydrogenase, 1026
Glycine incorporation
myxospore coat synthesis, 751

N-glycosidase activity
B. subtilis mutant, 438
Guanine operon
E. coli, 685
secondary promoter, 685
Guanosine tetraphosphate levels
Chromatium, 1018

Haemophilus influenzae
R plasmids, 356
Heterogeneity of wall O-polysaccharides
S. zuerich, 119
H_2-fumarate electron transport system
B. fragilis, 922
H incompatibility group plasmids, 174
Host cell reactivation
B. subtilis phage, 382
Hybrid plasmid
B. subtilis, transformation of, 374
E. coli, transformation of, 374
Hydrocarbons
C. tropicalis, 917
Hydrogenase activity
B. fragilis H_2-fumarate electron transport, 922

myo-Inositol transport
P. putida, 872
Iron transport components
E. coli, 331
Isocitrate lyase-directed inhibitor
itaconate, 136
P. indigofera, 136
Itaconate
P. indigofera, 136

Killer double-stranded ribonucleic acid synthesis
S. cerevisiae mutants, 735
Kinase replacement
dehydrogenase, 1026
E. coli glycerol utilization, 1026
Klebsiella aerogenes
glutamine synthetase, 446
urease synthesis, 446

L-Lactate dehydrogenase activation
S. lactis, 82
Lactose operons
E. coli, 123
recombination, 123
lacY
E. coli mutants, 830
Lambda phage
metBJF cluster, 795
Lambda prophage induction
E. coli, 208
Leptomonas sp., polyamines, 657
Leucine-containing peptides
transport in *S. cerevisiae*, 906
Leuconostoc mesenteroides
dextran synthesis and surface changes, 288
leu operon
E. coli mRNA, 997
lexB mutations
E. coli, 572

Light
effect of *B. bacteriovorus*, 399
Lipid
N. crassa differentiation, 188
Lipid bodies
T. caries teliospores, 662
Lipopolysaccharide
E. coli, 347
identification in polyacrylamide gels, 347
Luciferase synthesis
altered control, mutants with, 519
Lysine-containing peptides
transport in *S. cerevisiae*, 906
Lysocardiolipin
Acinetobacter sp. HO1-N, 486
Lysyl-transfer ribonucleic acid synthetase
E. coli, 589

Membrane energetics
cAMP, 854
E. coli, 854
Membrane potential
R. rubrum, 34
Mercurous ion reduction
E. coli bearing R factor, 696
Messenger ribonucleic acid
E. coli, 214, 997
enzymes specified by *leu* operon, 997
Messenger ribonucleoprotein complexes
N. crassa polysomes, 240
metBJF cluster
lambda phage, 795
Methanol metabolism
T. novellus, 389
Methylated neutral amino acids
E. coli ribosomes, 105
Minicells
E. coli, 363
mucopeptide biosynthesis, 363
Motility and coiling
spirochetes in viscous environments, 960
mplA
E. coli, 758
Mucopeptide biosynthesis
E. coli minicells, 363
Murein lipoprotein
E. coli mutant, 758
Mycoplasma
enzyme I, 988
PEP-dependent sugar PTS, 988
Myxospore coat synthesis
acetate incorporation, 751
glycine incorporation, 751
M. xanthus, 745, 751
UDP-*N*-acetylgalactosamine formation, 745

Nalidixic acid
E. coli R-plasmid transfer, 76
Neisseria gonorrhoeae
plasmids, 557
Neurospora crassa
adenine transport, 453
arginase, 719
lipids during differentiation, 188

mRNP complexes from polysomes, 240
nitrate reductase, 884
nitrogen regulation of arginase, 719
polysomes, 240
Nicotinamide adenine dinucleotide reduction
ferredoxin, 463
R. albus, 463
Nitrate reductase
N. crassa, 884
Nitrate reductase biosynthesis
cytochromes as oxygen sensors, 372
E. coli, 372
Nitrogen regulation
N. crassa arginase, 719
Nonsense suppressor genes
B. subtilis, 682
triosephosphate isomerase isozyme synthesis, 682
NR1
E. coli, 145
relaxation complex, 145

Osmolarity of growth medium
E. coli outer membrane protein pattern, 623
Osmotic behavior
S. cerevisiae, 564
Outer membrane proteins
E. coli, 331, 598, 608, 623, 631
osmolarity of growth medium, 623
regulation by iron, 331
Oxalate metabolism
T. novellus, 389
Oxygen sensors
cytochromes, 372
E. coli, 372
nitrate reductase biosynthesis, 372

Penicillin-binding proteins
E. coli cell division mutants, 293
Penicillin-ethylenediaminetetraacetate treatment
E. coli periplasmic enzymes, 710
Peptide transport
S. cerevisiae, 906
Periplasmic enzyme release
E. coli, 710
penicillin-EDTA treatment, 710
Phenolate compounds, synthesis of
E. coli, 331
regulation by iron, 331
Phosphate uptake
E. coli, 505
E. coli spheroplasts, 512
Phosphoenolpyruvate-dependent sugar phosphotransferase system
mycoplasma enzyme I, 988
Phosphoenolpyruvate:sugar phosphotransferase system
A. adetum, 716
Phospholipid
E. coli, 347
identification in polyacrylamide gels, 347
Phosphoriboisomerase
D. vulgaris extracts, 133
Phosphoribosylanthranilate isomerase-indoleglycerol phosphate synthetase
E. coli, 153
inactivation and partial degradation, 153
Photodynamic induction
C. reinhardtii, 650
polypeptide, 650
Phototaxis
R. rubrum, 34
Phthalate metabolism
4,5-dihydroxyphthalate accumulation, 42
P. testosteroni, 42
Physarum polycephalum
gad mutation, 247
plasmodium formation, 247
ploidy, 473
sporulation, 473
Pili
C. crescentus, 340
P. aeruginosa, 259
P-*lac*
maintenance in *E. coli*, 689
Plasmid
B. subtilis (*natto*), 699
B. subtilis, transformation of, 374
E. coli, transformation of, 374
Fin$^+$, 413
H incompatibility group, 174
H. influenzae, 356
N. gonorrhoeae, 557
P. aeruginosa, 765
P. glycinea, 224
S. coelicolor, 251
transfer in *P. aeruginosa*, 765
transformation of *E. coli* and *B. subtilis*, 374
Plasmid endonuclease
S. typhimurium, 583
Plasmid NR1
relaxation complex, 145
Plasmid pKM101
S. typhimurium endonuclease, 583
Plasmid pSC101
mutations to temperature sensitivity, 405
Plasmid R100.1
replication, 929
Plasmids *tra*Δ F′, 670
Plasmid transduction
B. pumilus, 1029
Plasmodium formation
gad mutation, 247
P. polycephalum, 247
Ploidy
P. polycephalum, 473
Podospora anserina
cycloheximide resistance, 876
ribosomal suppressors, 876
pol
P-*lac* maintenance in *E. coli*, 689
Polyacrylamide gels
polysaccharide and lipid identification, 347
Polyamines
C. fasciculata, 657
Leptomonas sp., 657
T. brucei, 657
T. mega, 657

Polypeptide
C. reinhardtii, 650
photodynamic induction, 650
O-polysaccharide
heterogeneity in *S. zuerich*, 119
Polysaccharide, surface
S. aureus, 194
Polysomes
N. crassa, 240
Porphyrin mutants
B. subtilis, 379
ppGpp levels
chromatium, 1018
Procaine hydrochloride
alkaline phosphatase induction in *E. coli*, 431
Promoter
E. coli guanine operon, 685
Propionate
E. coli, 1023
odd-chain-length fatty acids, 1023
Proteins
E. coli outer cell envelope membrane, 821
phage receptors, 821
Proteins 1 and 2
E. coli, 598
Protein synthesis
E. coli, 18
shift-down, 18
Proteus morganii
β-lactamase, 726
Proteus plasmid (P-*lac*)
maintenance in *E. coli*, 689
Pseudomonas aeruginosa
glucose-binding protein, 672
pili, 259
plasmid transfer, 765
R plasmid transfer, 765
Pseudomonas glycinea
plasmids, 224
Pseudomonas indigofera
itaconate, 136
Pseudomonas putida
dioxygenases, 741
myo-inositol transport, 372
Pseudomonas testosteroni
4,5-dihydroxyphthalate accumulation, 42
phthalate metabolism, 42
Pyruvate metabolism
ferredoxin, 463
R. albus, 463
Pyruvate metabolism, fermentative
R. rubrum, 533

rec
P-*lac* maintenance in *E. coli*, 689
RecBC and RecF pathways
colicin E1 synthesis in mutants, 1011
Recombination
E. coli, 208
E. coli lactose operons, 123
transient λ prophage induction, 208
Region I flagellar mutants
E. coli, 801
Relaxation complex
E. coli plasmid NR1, 145
relB
E. coli, 30
Resistance transfer factor
plasmid R100.1, 929
replication, 929
Restriction endonuclease
S. aureus, 645
R factor R100.1
dnaA, suppression of, 421
E. coli, 421
Rhizobium japonicum
glucose catabolism, 179
Rhizobium leguminosarum
zeatins in tRNA, 741
Rhodopseudomonas sphaeroides
antiserum against form II ribulose 1,5-bisphosphate carboxylase, 1020
gene transfer, 526
plasmid R68.45, 526
Rhodospirillum rubrum
phototaxis and membrane potential, 34
pyruvate metabolism, fermentative, 533
Rhodotorula
α-(1 → 3)-glucanase activity, 702
Ribonucleic acid
S. cerevisiae mutants, 735
Ribosomal alteration
B. subtilis sporulation, 866
Ribosomal suppressors and anti-suppressors
P. anserina cycloheximide resistance, 876
Ribosomes
E. coli, 105
methylated neutral amino acids, 105
Ribosome synthesis
E. coli, 7
energy source shift-down, 7
Ribulose 1,5-bisphosphate carboxylase, form II
antiserum directed against, 1020
R. sphaeroides, 1020
Ribulose-1,5-diphosphate carboxylase
D. vulgaris extracts, 133
Rifampin resistance
firA of *E. coli*, 1033
R-plasmid
anaerobic growth, 69
E. coli, 69, 76
H. influenzae, 356
nalidixic acid, 76
P. aeruginosa, 765
transfer in *P. aeruginosa*, 765
R plasmid NR1
relaxation complex, 145
R plasmid pSC101
mutations to temperature sensitivity, 405
R-plasmid transfer
E. coli, 76
nalidixic acid, 76
Ruminococcus albus
ferredoxin, 463
NAD reduction, 463
pyruvate metabolism, 463

Saccharomyces cerevisiae
acid phosphatase and cell wall formation, 638
allantoin transport, 839

arginase induction, 163
cell envelope permeability, 564
cell wall formation, 638
killer dsRNA synthesis, 735
osmotic behavior, 564
peptide transport, 906
thiamine transport, 951
Salmonella paratyphi C
Vi antigen expression, 57
Salmonella typhimurium
L-cystine transport, 111
plasmid endonuclease, 583
Salmonella zuerich
heterogeneity of wall O-polysaccharide, 119
Selenium requirement
C. sporogenes growth, 366
Stickland reaction systems, 366
Shift-down
E. coli ribosome synthesis, 7
protein synthesis in *E. coli*, 18
Sodium ions
E. coli glutamate transport, 848
α-aminoisobutyric acid uptake in *Bacillus*, 484
Spirochetes
coiling and motility, 960
Spore coat protein synthesis
C. perfringens, 713
Sporulation
B. subtilis, 866
P. polycephalum, 473
ribosomal alteration, 866
Stalkless mutants
C. crescentus, 280
Staphylococcus aureus
cell wall teichoic acid, 477
class II restriction endonuclease, 645
endonuclease, 645
restriction endonuclease, 645
surface polysaccharide, 194
Stickland reaction systems
C. sporogenes, 366
selenium, 366
Streptococcus lactis
L-lactate dehydrogenase activation, 82
Streptomyces coelicolor
plasmid, 251
Sugar phosphate formation
colicin K-treated *E. coli*, 229
Superoxide dismutase location
E. coli, 815
Surface changes
L. mesenteroides dextran synthesis, 288
Surface polysaccharide
S. aureus, 194

Teichoic acid
S. aureus cell wall, 477
Temperature sensitivity
R plasmid pSC101, 405
Tetrapyrrole utilization
B. ruminicola, 809
Thiamine disulfides
thiamine transport in *S. cerevisiae*, 1013
Thiamine transport
S. cerevisiae, 1013
thiamine disulfides, 1013
Thiobacillus novellus
formamide metabolism, 389
formate metabolism, 389
methanol metabolism, 389
oxalate metabolism, 389
Threonyl-transfer ribonucleic acid synthetase
E. coli, 943
Tilletia caries teliospores
lipid bodies, 662
*tra*Δ F′ plasmids
heteroduplex analysis, 670
Transfer ribonucleic acid
A. tumefaciens, 741
C. fascians, 741
E. amylovora, 741
R. leguminosarum, 741
zeatins, 741
Transient lambda induction
E. coli, 208
Triosephosphate isomerase isozyme synthesis
B. subtilis nonsense suppressor genes, 682
Trypanosoma bruci polyamines, 657
Trypanosoma mega polyamines, 657

Ultraviolet light resistance
E. coli, 208
transient λ prophage induction, 208
Urease synthesis
glutamine synthetase, 446
K. aerogenes, 446
Uridine 5′-diphosphate-*N*-acetylgalactosamine formation
myxospore development, 745

Vi antigen expression
S. paratyphi C, 57

Yeast
S-adenosylmethionine in germinating ascospores, 63

Zeatin
A. tumefaciens tRNA, 741
C. fascians tRNA, 741
E. amylovora tRNA, 741
R. leguminosarum tRNA, 741

INDEX TO DATE OF ISSUE

Month	Date of Issue	Pages
July	19 July 1977	1–378
August	6 August 1977	379–718
September	31 August 1977	719–1037

JOURNAL

OF

BACTERIOLOGY

VOLUME 132

WASHINGTON, D C 20006

1977

JOURNAL OF BACTERIOLOGY

VOLUME 132 • 1977

EDITORIAL BOARD

L. Leon Campbell, Editor-in-Chief (1980)
University of Delaware, Newark

S. G. Bradley, Editor (1979)
Virginia Commonwealth University, Richmond

Allen T. Phillips, Editor (1980)
Pennsylvania State University, University Park, Pa.

Elizabeth McFall, Editor (1980)
New York University, New York, N.Y.

Carl Schnaitman, Editor (1978)
University of Virginia, Charlottesville

Donald P. Nierlich, Editor (1982)
University of California, Los Angeles

Simon Silver, Editor (1981)
Washington University, St. Louis, Mo.

Mark Achtman (1979)
James N. Adams (1979)
James Akagi (1979)
David Apirion (1979)
Arthur I. Aronson (1979)
Gad Avigad (1977)
Stephen D. Barbour (1979)
Richard S. Berk (1977)
Harriet Bernheimer (1977)
Judith S. Bond (1977)
Winfried Boos (1979)
H. D. Braymer (1979)
Jean Brenchley (1977)
George H. Brownell (1977)
Richard O. Burns (1977)
Peter J. Chapman (1979)
G. William Claus (1979)
Don B. Clewell (1977)
Stanely N. Cohen (1979)
Ronald S. Cole (1977)
S. F. Conti (1978)
Stephen Cooper (1978)
John E. Cronan, Jr. (1977)
Walter J. Dobrogosz (1979)
Patrick R. Dugan (1977)
A. Eisenstark (1979)
Alan D. Elbein (1979)
Wolfgang Epstein (1978)
David P. Fan (1978)
Walton L. Fangman (1978)
Gerald R. Fink (1978)
W. R. Finnerty (1979)
John D. Foulds (1979)
Harry E. Gilleland, Jr. (1979)
Walter R. Guild (1978)
Tadayo Hashimoto (1979)
Gerald L. Hazelbauer (1978)
George Hegeman (1977)
James A. Hoch (1977)
Joy Hochstadt (1977)
Bruce Holloway (1979)
Stanley C. Holt (1977)
Philip Hylemon (1979)
Robert J. Kadner (1979)
Sam Kaplan (1977)
Jost Kemper (1978)
David E. Kennell (1977)
Bruce C. Kline (1977)
Thomas G. Lessie (1979)
Robert L. Lester (1978)
Hillel S. Levinson (1978)
K. Brooks Low (1979)
Calvin S. McLaughlin (1978)
P. T. Magee (1977)
Michael H. Malamy (1978)
Manley Mandel (1978)
Robert E. Marquis (1979)
Neil H. Mendelson (1978)
Gene E. Michaels (1977)
Eugene W. Nester (1978)
John H. Nordin (1979)
Michio Oishi (1977)
Ronald H. Olsen (1978)
Sunil Palchaudhuri (1979)
Charles Panos (1978)
Leo Parks (1979)
Martin Pato (1978)
William S. Reznikoff (1979)
Palmer Rogers (1978)
Antonio H. Romano (1979)
Robert Rownd (1977)
Harold L. Sadoff (1977)
Milton H. Saier, Jr. (1979)
Gene A. Scarborough (1979)
Irwin H. Segel (1979)
Jane K. Setlow (1978)
J. A. Shapiro (1978)
Issar Smith (1978)
Lucile Smith (1978)
Dieter G. Soll (1979)
Dwight Stinnett (1979)
Robert L. Switzer (1979)
Bonnie M. Tyler (1978)
James A. Wechsler (1978)
David White (1977)
Clifford A. Woolfolk (1979)
Howard Zalkin (1979)

Robert A. Day, *Managing Editor*
Gisella Pollock, *Assistant Managing Editor*
Linda Illig, *Production Editor*
1913 I St., N. W., Washington, D. C. 20006

EX OFFICIO

A. Frederick Rasmussen, Jr., *President* (1977–1978)
J. Mehsen Joseph, *Secretary*

Edwin H. Lennette, *Vice-President* (1977–1978)
Brinton M. Miller, *Treasurer*

The *Journal of Bacteriology*, a publication of the American Society for Microbiology, 1913 I St., N.W., Washington, D.C. 20006, is devoted to the advancement and dissemination of fundamental knowledge concerning bacteria and other microorganisms. The *Journal* is published monthly, and the twelve numbers are divided into four volumes per year. The nonmember subscription price is $105 per year. Single copies are $9. The member subscription price is $21 per year. Correspondence relating to subscriptions, reprints, defective copies, availability of back issues, lost or late proofs, disposition of submitted manuscripts, and general editorial matters should be directed to the ASM Publications Office, 1913 I St., N.W., Washington, D.C. 20006 (area 202 833-9680).

Second class postage paid at Washington, D. C. 20006, and at additional mailing offices.
Made in the United States of America.

Copyright © 1977, American Society for Microbiology.
All Rights Reserved.

Morphology and Ultrastructure

Efficient Sporulation of Yeast in Media Buffered near pH 6. JOHN H. MCCUSKER AND JAMES E. HABER* 180

Envelope-Associated Nucleoid from *Caulobacter crescentus* Stalked and Swarmer Cells. MARIAN EVINGER AND NINA AGABIAN* 294

Motility of Flagellated Bacteria in Viscous Environments. E. P. GREENBERG AND E. CANALE-PAROLA* 356

Genetics and Molecular Biology

Resistance of *Escherichia coli* to Penicillins: Fine-Structure Mapping and Dominance of Chromosomal Beta-Lactamase Mutations. STAFFAN NORMARK* AND LARS G. BURMAN 1

[^{3}H]dihydrostreptomycin Accumulation and Binding to Ribosomes in *Rhizobium* Mutants with Different Levels of Streptomycin Resistance. IRENA ZELAZNA-KOWALSKA 8

Functional Modifications of the Translational System in *Bacillus subtilis* During Sporulation. GLENN H. CHAMBLISS* AND LUCIENNE LEGAULT-DEMARE 13

Genetic Locus (*ompB*) Affecting a Major Outer-Membrane Protein in *Escherichia coli* K-12. VIMALA SARMA* AND PETER REEVES 23

Stimulation of Yeast Mating Hormone Activity by Synthetic Oligopeptides. DIETER STÖTZLER, RICHARD BETZ, AND WOLFGANG DUNTZE* 28

Thymidine 5′-Monophosphate-Requiring Mutants of *Saccharomyces cerevisiae* Are Deficient in Thymidylate Synthetase. LINDA BISSON AND JEREMY THORNER* 44

Use of *argA-lac* Fusions to Generate Lambda *argA-lac* Bacteriophages and to Determine the Direction of *argA* Transcription in *Escherichia coli*. THOMAS ECKHARDT 60

Regulation of *argA* Operon Expression in *Escherichia coli* K-12: Cell-Free Synthesis of Beta-Galactosidase Under *argA* Control. NORMAN KELKER* AND THOMAS ECKHARDT 67

Lipiarmycin-Resistant Ribonucleic Acid Polymerase Mutants of *Bacillus subtilis*. ABRAHAM L. SONENSHEIN,* HANNAH B. ALEXANDER, DAVID M. ROTHSTEIN, AND SUSAN H. FISHER 73

Requirement of Cyclic Adenosine 3′,5′-Monophosphate for the Thermosensitive Effects of Rts1 in a Cyclic Adenosine 3′,5′-Monophosphate-Less Mutant of *Escherichia coli*. TATSUO YAMAMOTO, TAKESHI YOKOTA, AND AKIRA KAJI* 80

Replication of Thermosensitive Rts1 Plasmid Deoxyribonucleic Acid at the Nonpermissive Temperature. TATSUO YAMAMOTO AND AKIRA KAJI* 90

Regulatory Mutations in the *Klebsiella aerogenes* Structural Gene for Glutamine Synthetase. ROBERT A. BENDER AND BORIS MAGASANIK* 100

Autogenous Regulation of the Synthesis of Glutamine Synthetase in *Klebsiella aerogenes*. ROBERT A. BENDER AND BORIS MAGASANIK* 106

* Asterisk refers to person to whom inquiries regarding the paper should be addressed.

Identification of a Temperature-Sensitive Asparaginyl-Transfer Ribonucleic Acid Synthetase Mutant of *Escherichia coli*. MASAYUKI YAMAMOTO,* MASAYASU NOMURA, HISAO OHSAWA, AND BUNJI MARUO 127

Physiological Effects of Growth of an *Escherichia coli* Temperature-Sensitive *dnaZ* Mutant at Nonpermissive Temperatures. HERMAN CHU, MARGARET M. MALONE, WILLIAM G. HALDENWANG, AND JAMES R. WALKER* 151

Role of Methionine in the Synthesis of Nucleoside Q in *Escherichia coli* Transfer Ribonucleic Acid. JON R. KATZE,* MICHAEL H. SIMONIAN, AND RAYMOND D. MOSTELLER 174

Mercury and Organomercurial Resistances Determined by Plasmids in *Pseudomonas*. DAN L. CLARK,* ALISON A. WEISS, AND SIMON SILVER 186

Mercury and Organomercurial Resistances Determined by Plasmids in *Staphylococcus aureus*. ALISON A. WEISS,* SANDRA D. MURPHY, AND SIMON SILVER 197

A Third β-Galactosidase in a Strain of *Klebsiella* That Possesses Two *lac* Genes. BARRY G. HALL* AND ERIC C. R. REEVE 219

Ribonucleic Acid Polymerase Mutant of *Escherichia coli* Defective in Flagella Formation. T. YAMAMORI, K. ITO, T. YURA,* T. SUZUKI, AND T. IINO 254

Isolation and Characterization of Fusidic Acid-Resistant, Sporulation-Defective Mutants of *Bacillus subtilis*. HIDEKI KOBAYASHI, KOMEI KOBAYASHI, AND YASUO KOBAYASHI* 262

Tryptophan-Transducing Bacteriophages: In Vitro Studies with Restriction Endonucleases *Hin*dII + III and *Escherichia coli* Ribonucleic Acid Polymerase. BARBARA B. JONES AND WILLIAM S. REZNIKOFF* 270

Amino Acid Replacement in a Mutant Lipoprotein of the *Escherichia coli* Outer Membrane. SUMIKO INOUYE, NANCY LEE, MASAYORI INOUYE,* HENRY C. WU, HIDEO SUZUKI, YUKINOBU NISHIMURA, HIROKO IKETANI, AND YUKINORI HIROTA 308

Isolation and Genetic Analysis of Deletion Mutants of Colicin E1 Plasmids Carrying a TnA Insertion. JOSEPH INSELBURG* AND PATRICIA WARE 321

Studies of Colicin E1 Plasmid Functions by Analysis of Deletions and TnA Insertions of the Plasmid. JOSEPH INSELBURG 332

Induction of Yeast Killer Factor Mutations. MICHAEL VODKIN 346

Transformation in *Escherichia coli*: Cryogenic Preservation of Competent Cells. D. A. MORRISON 349

Effect of the *relA* Gene on Derepression of Amino Acid Biosynthetic Enzymes in Growing *Escherichia coli* Depends on the Pathway Being Derepressed. ANTHONY V. FURANO* AND FREDERICK P. WITTEL 352

Localized Mutagenesis with Bacteriophage Mu: Method for Increasing the Frequency of Specific Bacterial Mutants. HERBERT TABOR,* EDMUND W. HAFNER, AND CELIA WHITE TABOR 359

Physiology and Metabolism

Variations in the Adenylate Energy Charge During Phased Growth (Cell Cycle) of *Candida utilis* Under Energy Excess and Energy-Limiting Growth Conditions. K. CHANDAPILLAI THOMAS* AND PETER S. S. DAWSON 36

2-Hydroxypyridine Metabolism and Pigment Formation in Three *Arthrobacter* Species. P. E. KOLENBRANDER* AND M. WEINBERGER 51

Respiratory Competence of *Dictyostelium discoideum* Spores. LAWRENCE KOBILINSKY AND DIANA S. BEATTIE* 113

Carbon Monoxide Oxidation by Methanogenic Bacteria. L. DANIELS, G. FUCHS, R. K. THAUER, AND J. G. ZEIKUS* 118

Effect of Urea Concentration on Growth of *Ureaplasma urealyticum* (T-Strain Mycoplasma). GEORGE E. KENNY* AND FRANK D. CARTWRIGHT 144

Intracellular Distribution of Enzymes of Phospholipid Metabolism in Several Gram-Negative Bacteria. ANURADHA DUTT AND WILLIAM DOWHAN* 159

Xylitol and D-Arabitol Toxicities Due to Derepressed Fructose, Galactitol, and Sorbitol Phosphotransferases of *Escherichia coli*. ALBEY M. REINER 166

Protein Synthesis During Morphogenesis of *Mucor racemosus*. MICHAEL ORLOWSKI AND PAUL S. SYPHERD* 209

Sulfate Uptake in *Saccharomyces cerevisiae*: Biochemical and Genetic Study. ANNICK BRETON AND YOLANDE SURDIN-KERJAN* 224

Deoxyribonucleic Acid Synthesis in Permeabilized Spheroplasts of *Saccharomyces cerevisiae*. WOLFGANG OERTEL AND MEHRAN GOULIAN* 233

Immunological Study of the Regulation of Cellular Arylsulfatase Synthesis in *Klebsiella aerogenes*. YOSHIKATSU MUROOKA,* TAKASHI YAMADA, SHIZUO TANABE, AND TOKUYA HARADA 247

Metal Ion Dependence of a Heat-Modifiable Protein from the Outer Membrane of *Escherichia coli* upon Sodium Dodecyl Sulfate-Gel Electrophoresis. JOHN C. MCMICHAEL* AND JONATHAN T. OU 314

Enzymology

Characterization of a Novel Thiosulfate-Forming Enzyme Isolated from *Desulfovibrio vulgaris*. H. L. DRAKE AND J. M. AKAGI* 132

Bisulfite Reductase of *Desulfovibrio vulgaris*: Explanation for Product Formation. H. L. DRAKE AND J. M. AKAGI* 139

Location and Properties of Glucose Dehydrogenase in Sporulating Cells and Spores of *Bacillus subtilis*. YASUTARO FUJITA, ROBERT RAMALEY, AND ERNST FREESE* 282

Purification and Characterization of the Membrane-Bound Ferrochelatase from *Spirillum itersonii*. H. A. DAILEY, JR. 302

Properties of the Beta-Lactamase Specified by the *Pseudomonas* Plasmid RPL11. MARGARET MATTHEW* AND R. B. SYKES 341

Errata

Purification and Properties of Homoprotocatechuate 2,3-Dioxygenase from *Bacillus stearothermophilus*. MOIDEEN P. JAMALUDDIN 362

Lipophilic O-Antigens in *Rhodospirillum tenue*. J. WECKESSER, G. DREWS, R. INDIRA, AND H. MAYER 362

Volume 132

Contents for November 1977

Number 2

Morphology and Ultrastructure

Lysozyme-Promoted Association of Protein I Molecules in the Outer Membrane of *Escherichia coli*. I. CHOPRA,* T. G. B. HOWE, AND P. R. BALL 411

Isolation and Properties of Two Classes of Low-Density Vesicles from *Saccharomyces cerevisiae*. T. G. CARTLEDGE, A. H. ROSE,* DIANE M. BELK, AND ADELINA A. GOODALL 426

Chemotaxis by *Bdellovibrio bacteriovorus* Toward Prey. SUSAN C. STRALEY AND S. F. CONTI* 628

Aspergillus nidulans Mutant Lacking α-(1,3)-Glucan, Melanin, and Cleistothecia. I. POLACHECK AND R. F. ROSENBERGER* 650

Localization of Proteins Controlling Motility and Chemotaxis in *Escherichia coli*. H. F. RIDGWAY,* M. SILVERMAN, AND M. I. SIMON 657

Intracellular, Periodic Structures in the Gliding Bacterium *Myxococcus xanthus*. ANNE C. BURCHARD, ROBERT P. BURCHARD,* AND JOHN A. KLOETZEL 666

Icosahedral Inclusions (Carboxysomes) of *Nitrobacter agilis*. J. M. SHIVELY,* E. BOCK, K. WESTPHAL, AND G. C. CANNON 673

Molecular Basis for the Maximum Growth Temperature of an Obligately Psychrophilic Yeast, *Leucosporidium stokesii*. SCOTT A. SILVER, IRVIN YALL, AND NORVAL A. SINCLAIR* 676

Cell Wall and Morphological Changes Induced by Temperature Shift in *Bacillus subtilis* Cell Wall Mutants. M. A. SHIFLETT, DAVID BROOKS, AND F. E. YOUNG* 681

Distribution and Conformation of Crystalline Nigeran in Hyphal Walls of *Aspergillus niger* and *Aspergillus awamori*. T. F. BOBBITT, J. H. NORDIN, M. ROUX, J. F. REVOL, AND R. H. MARCHESSAULT. 691

Visualization of Ribosomal Ribonucleic Acid Synthesis in a Ribonuclease III-Deficient Strain of *Escherichia coli*. SANDRA HOFMANN AND OSCAR L. MILLER, JR.* 718

Caulobacter Flagellins. CARL LAGENAUR AND NINA AGABIAN* 731

Cell Size and Budding During Starvation of the Yeast *Saccharomyces cerevisiae*. G. C. JOHNSTON 738

Genetics and Molecular Biology

Pseudomonas aeruginosa Mutants Resistant to Urea Inhibition of Growth on Acetanilide. MARY GREGORIOU,* PAUL R. BROWN, AND RENÉE TATA 377

Intracellular Localization and Effects on Cell Division of a Plasmid Blocked in Deoxyribonucleic Acid Replication. H. A. MACQUEEN AND W. D. DONACHIE* 392

Regulation of a Common Amidotransferase Subunit. JAMES F. KANE 419

Regulation of Aromatic Amino Acid Transport Systems in *Escherichia coli* K-12. MARGARET J. WHIPP* AND A. J. PITTARD. 453

Further Mapping of Several Membrane Lipid Biosynthetic Genes (*fabC*, *fabB*, *gpsA*, *plsB*) of *Escherichia coli*. DAVID CLARK AND JOHN E. CRONAN, JR.* .. 549

Transformation in Pneumococcus: Existence and Properties of a Complex Involving Donor Deoxyribonucleate Single Strands in Eclipse. D. A. MORRISON ... 576

Fractionation of Inducible Alkane Hydroxylase Activity in *Pseudomonas putida* and Characterization of Hydroxylase-Negative Plasmid Mutations. SPENCER BENSON, MICHAEL FENNEWALD, JAMES SHAPIRO,* AND CHARLES HUETTNER .. 614

Regulatory Mutations of the *Pseudomonas* Plasmid *alk* Regulon. MICHAEL

FENNEWALD AND JAMES SHAPIRO* 622

Revised Interpretation of the Origin of the pSC101 Plasmid. STANLEY N. COHEN* AND ANNIE C. Y. CHANG 734

Physical Mapping of Genes on the F Plasmid of *Escherichia coli* Responsible for Inhibition of Growth of Female-Specific Bacteriophages. SUNIL PALCHAUDHURI AND WERNER K. MAAS* 740

Physiology and Metabolism

Multivalent Induction of Biodegradative Threonine Deaminase. YOSHIKI YUI, YASUYOSHI WATANABE, SEIJI ITO, YUTAKA SHIZUTA, AND OSAMU HAYAISHI* 363

Requirements for Induction of the Biodegradative Threonine Dehydratase in *Escherichia coli*. RITA M. EGAN AND ALLEN T. PHILLIPS* 370

Role of Threonine Dehydrogenase in *Escherichia coli* Threonine Degradation. R. POTTER, V. KAPOOR, AND E. B. NEWMAN* 385

Properties of *Escherichia coli* Mutants Deficient in Enzymes of Glycolysis. MEHER H. IRANI* AND P. K. MAITRA 398

Membrane Phospholipid Synthesis and Phenotypic Correlation of an *Escherichia coli pss* Mutant. AKINORI OHTA AND ISAO SHIBUYA* 434

Levels of Acetyl Coenzyme A, Reduced and Oxidized Coenzyme A, and Coenzyme A in Disulfide Linkage to Protein in Dormant and Germinating Spores and Sporulating Cells of *Bacillus megaterium*. BARBARA SETLOW AND PETER SETLOW* 444

a-Factor from *Saccharomyces cerevisiae*: Partial Characterization of a Mating Hormone Produced by Cells of Mating Type a. RICHARD BETZ, VIVIAN L. MACKAY,* AND WOLFGANG DUNTZE 462

Bacillus subtilis Mutant with Temperature-Sensitive Net Synthesis of Phosphatidylethanolamine. VIVEKA LINDGREN,* ERIK HOLMGREN, AND LARS RUTBERG 473

Membrane Lipid Biosynthesis in *Acholeplasma laidlawii* B: Incorporation of Exogenous Fatty Acids into Membrane Glyco- and Phospholipids by Growing Cells. YUJI SAITO AND RONALD N. MCELHANEY* 485

Membrane Lipid Biosynthesis in *Acholeplasma laidlawii* B: De Novo Biosynthesis of Saturated Fatty Acids by Growing Cells. YUJI SAITO, JOHN R. SILVIUS, AND RONALD N. MCELHANEY* 497

Regulation of Superoxide Dismutase Synthesis in *Escherichia coli*: Glucose Effect. H. MOUSTAFA HASSAN AND IRWIN FRIDOVICH* 505

Kinetic Characterization of the Two Phosphate Uptake Systems in the Fungus *Neurospora crassa*. DONALD J. W. BURNS* AND ROSS E. BEEVER 511

Adaptive Changes in Phosphate Uptake by the Fungus *Neurospora crassa* in Response to Phosphate Supply. ROSS E. BEEVER* AND DONALD J. W. BURNS 520

Regulation of Fatty Acid Synthesis During the Cessation of Phospholipid Biosynthesis in *Escherichia coli*. WILLIAM D. NUNN,* DAVID L. KELLY, AND MICHELLE Y. STUMFALL 526

Evidence for a Complex of Three Beta-Oxidation Enzymes in *Escherichia coli*: Induction and Localization. W. J. O'BRIEN* AND F. E. FRERMAN 532

Glucose Transport in *Streptococcus agalactiae* and Its Inhibition by Lactoperoxidase-Thiocyanate-Hydrogen Peroxide. M. N. MICKELSON 541

Obligatory Coupling Between Proton Entry and the Synthesis of Adenosine 5'-Triphosphate in *Streptococcus lactis*. PETER C. MALONEY 564

Macromolecular Synthesis and Degradation in *Arthrobacter* During Periods of Nutrient Deprivation. CARIN G. SCHERER AND CHARLES W. BOYLEN* 584

Cleavage of Adenosine 5'-Monophosphate During Uptake by *Streptomyces gri-*

seus. JUAN F. MARTIN AND ARNOLD L. DEMAIN* 590

Oxidoreductases Involved in Cell Carbon Synthesis of *Methanobacterium thermoautotrophicum*. J. G. ZEIKUS,* G. FUCHS, W. KENEALY, AND R. K. THAUER 604

Secretion of Lipids Induced by Inhibition of Peptidoglycan Synthesis in Streptococci. DIANE HORNE, REGINE HAKENBECK, AND ALEXANDER TOMASZ* 704

Growth and Cell Division During Nitrogen Starvation of the Yeast *Saccharomyces cerevisiae*. GERALD C. JOHNSTON,* RICHARD A. SINGER, AND E. SANDRA MCFARLANE 723

Production of Large Amounts of Acetate During Germination of *Bacillus megaterium* Spores in the Absence of Exogenous Carbon Sources. BARBARA SETLOW, LUCA K. SHAY, JAMES C. VARY, AND PETER SETLOW* 744

Unstable *S*-Adenosylmethionine Synthetase in an Ethionine-Resistant Strain of *Neurospora crassa*. ERIC S. JACOBSON,* GREGORY S. CHEN, AND ROBERT L. METZENBERG 747

Enzymology

Characterization of the Fatty Acid-Sensitive Glucose 6-Phosphate Dehydrogenase from *Pseudomonas cepacia*. A. F. CACCIAPUOTI AND T. G. LESSIE* 555

Nitrogen and Ammonia Assimilation in the Cyanobacteria: Purification of Glutamine Synthetase from *Anabaena* sp. Strain CA. GARY STACEY, F. ROBERT TABITA,* AND CHASE VAN BAALEN 596

Purification and Partial Characterization of the Principal Deoxyribonucleic Acid Polymerase from *Mycoplasmatales*. L. BRUCE MILLS, ERIC J. STANBRIDGE, W. DAVID SEDWICK, AND DAVID KORN* 641

Erratum

Transfer of Chromosomal Genes Mediated by Plasmid R68.45 in *Rhodopseudomonas sphaeroides*. W. R. SISTROM 749

Volume 132 Contents for December 1977 Number 3

Morphology and Ultrastructure

Phycocyanin Synthesis and Degradation in the Blue-Green Bacterium *Anacystis nidulans*. REGINALD H. LAU, MARGARET M. MACKENZIE, AND W. FORD DOOLITTLE* 771

Inhibitory Action of a Non-Metabolizable Fatty Acid on the Growth of *Escherichia coli*: Role of Metabolism and Outer Membrane Integrity. JOSÉ P. FAY AND RICARDO N. FARÍAS* 790

Osmotic Imbalance in Inositol-Starved Spheroplasts of *Saccharomyces cerevisiae*. KATHARINE D. ATKINSON,* ANITA I. KOLAT, AND SUSAN A. HENRY 806

Novel Bacterium Infecting an African Snail. ROGER M. COLE,* CHARLES S. RICHARDS, AND TERRY J. POPKIN 950

Ultrastructural Localization of Alkaline Phosphatase in the Blue-Green Bacterium *Plectonema boryanum*. B. B. DOONAN AND T. E. JENSEN* 967

Microtubular Structures in a Stable Staphylococcal L-Form. TOHRU EDA, YAYOI KANDA, CHIZURU MORI, AND SADAO KIMURA* 1024

Reconstitution and Purification of Flagellar Filaments from *Caulobacter crescentus*. MICHAEL SHEFFERY AND AUSTON NEWTON* 1027

Anaerobic Electron Transport in Anaerobic Flagellum Formation in *Escherichia coli*. R. HERTZ AND J. BAR-TANA* 1034

Germination-Defective Mutant of *Neurospora crassa* That Responds to Siderophores. GISELA CHARLANG* AND NORMA P. WILLIAMS 1042

Genetics and Molecular Biology

Direct Selective Procedure for Isolating *Neurospora* Mutants Defective in Nicotinamide Adenine Dinucleotide Phosphate-Specific Glutamate Dehydrogenase. JOHN A. KINSEY 751

Isolation of a λ*dcys* Transducing Bacteriophage and Its Use in Determining the Regulation of Cysteine Messenger Ribonucleic Acid Synthesis in *Escherichia coli* K-12. A. L. FIMMEL AND R. E. LOUGHLIN* 757

Thymineless Death in *Escherichia coli dnaB* Mutants and in a *dnaB dnaG* Double Mutant. N. SICARD AND F. BOUVIER* 779

Genetic Mapping of the F Plasmid Gene That Promotes Degradation of Stable Ribonucleic Acid in *Escherichia coli*. YOSHINARI OHNISHI,* HATSUMI IGUMA, TSUNEKO ONO, HARUKO NAGAISHI, AND ALVIN J. CLARK 784

Genetic Analysis of Components Involved in Vitamin B_{12} Uptake in *Escherichia coli*. PHILIP J. BASSFORD, JR., AND ROBERT J. KADNER* 796

Plasmid Content and Tumor Initiation Complementation by *Agrobacterium tumefaciens* IIBNV6. BARBARA B. LIPPINCOTT, JEAN B. MARGOT, AND JAMES A. LIPPINCOTT* 824

Isolation of a *metK* Mutant with a Temperature-Sensitive *S*-Adenosylmethionine Synthetase. EDMUND W. HAFNER,* CELIA WHITE TABOR, AND HERBERT TABOR 832

Restriction-Like Phenomena in Transformation of *Bacillus subtilis recA*. C. T. HADDEN 847

Repair and Subsequent Fragmentation of Deoxyribonucleic Acid in Ultraviolet-Irradiated *Bacillus subtilis recA*. C. T. HADDEN 856

Donor Strains of the Soft-Rot Bacterium *Erwinia chrysanthemi* and Conjugational Transfer of the Pectolytic Capacity. ARUN K. CHATTERJEE AND MORTIMER P. STARR* 862

Characterization of Fusions Between the *lac* Operon and the *ilv* Gene Cluster in *Escherichia coli*: *ilvC-lac* Fusions. JOHN M. SMITH AND H. E. UMBARGER* . 870

In Vitro Synthesis of β-Galactosidase with *ilv-lac* Fusion Deoxyribonucleic Acid as Template. JADWIGA WILD, JOHN M. SMITH, AND H. E. UMBARGER* 876

Cell Cycle Analysis of F′*lac* Replication in *Escherichia coli* B/r. MARK FINKELSTEIN AND CHARLES E. HELMSTETTER* 884

Genetic Analysis of the *Escherichia coli* K-12 *srl* Region. KEVIN MCENTEE 904

Escherichia coli K-12 Mutants Hyperproducing Chromosomal Beta-Lactamase by Gene Repetitions. STAFFAN NORMARK,* THOMAS EDLUND, THOMAS GRUNDSTRÖM, SVEN BERGSTRÖM, AND HANS WOLF-WATZ 912

Host-Dependent, Thermosensitive Replication of an R Plasmid, pJY5, Isolated from *Enterobacter cloacae*. TATSUO YAMAMOTO AND TAKESHI YOKOTA* 923

Characterization of Hybrid Plasmids Carrying Individual Ribosomal Ribonucleic Acid Transcription Units of *Escherichia coli*. MARIAN ELLWOOD KENERLEY, EDWARD A. MORGAN, LEONARD POST, LASSE LINDAHL, AND MASAYASU NOMURA* 931

Membrane Asymmetry and Expression of Cell Surface Antigens of *Micrococcus lysodeikticus* Established by Crossed Immunoelectrophoresis. PETER OWEN AND MILTON R. J. SALTON* 974

Generation of Miniplasmids from Copy Number Mutants of the R Plasmid NR1. DEAN P. TAYLOR, JERROLD GREENBERG, AND ROBERT H. FOWND* 986

Synthesis of *mot* and *che* Gene Products of *Escherichia coli* Programmed by Hybrid ColE1 Plasmid in Minicells. P. MATSUMURA,* M. SILVERMAN, AND M. SIMON 996

Selection of Yeast Auxotrophs by Thymidylate Starvation. BARRY J. BARCLAY AND J. G. LITTLE* 1036

Formation of HfrH-Type Donor Cells as a Result of Integrative Suppression by R-F Recombinant Plasmids. THEA HORODNICEANU,* H. J. DABERNAT, J. C. LEFEVRE, AND D. H. BOUANCHAUD 1038

Heat Sensitivity of *Haemophilus influenzae* Containing Defective Prophage. JANE K. SETLOW 1048

Physiology and Metabolism

Energy-Dependent Inactivation of Citrate Lyase in *Enterobacter aerogenes*. HANS KULLA AND GERHARD GOTTSCHALK* 764

Synthesis of Ribonucleotides and Their Participation in Ribonucleic Acid Synthesis by *Coxiella burnetii*. ROBIN G. CHRISTIAN AND D. PARETSKY* 841

Isolation and Preparation of Pretyrosine, Accumulated as a Dead-End Metabolite by *Neurospora crassa*. R. A. JENSEN,* L. ZAMIR, M. ST. PIERRE, N. PATEL, AND D. L. PIERSON 896

Effects of a Protease Inhibitor on Biosynthesis of *Escherichia coli* Proteins. KOREAKI ITO 1021

Identification of Adenosine 3′,5′-Monophosphate in *Mycobacterium smegmatis*. C. H. LEE 1031

Outer Membrane of Gram-Negative Bacteria. XV. Transmembrane Diffusion Rates in Lipoprotein-Deficient Mutants of *Escherichia coli*. HIROSHI NIKAIDO,* PATRICK BAVOIL, AND YUKINORI HIROTA 1045

Enzymology

Isolation and Preliminary Characterization of Two Forms of Ribulose 1,5-Bisphosphate Carboxylase from *Rhodopseudomonas capsulata*. JANET L. GIBSON AND F. ROBERT TABITA* 818

Ferredoxin and Formyltetrahydrofolate Synthetase: Comparative Studies with *Clostridium acidiurici*, *Clostridium cylindrosporum*, and Newly Isolated Anaerobic Uric Acid-Fermenting Strains. ALEXANDER B. CHAMPION AND JESSE C. RABINOWITZ* 1003

Erratum

Release of Periplasmic Enzymes from *Escherichia coli* by Penicillin-Ethylenediaminetetraacetate Treatment. H. N. ANANTHASWAMY 1050

AUTHOR INDEX

VOLUME 132

Agabian, Nina, 294, 731
Akagi, J. M., 132, 139
Alexander, Hannah B., 73
Atkinson, Katharine D., 806

Ball, P. R., 411
Barclay, Barry J., 1036
Bar-Tana, J., 1034
Bassford, Philip J., Jr., 796
Bavoil, Patrick, 1045
Beattie, Diane S., 113
Beever, Ross E., 511, 520
Belk, Diane M., 426
Bender, Robert A., 100, 106
Benson, Spencer, 614
Bergström, Sven, 912
Betz, Richard, 28, 462
Bisson, Linda, 44
Bobbitt, T. F., 691
Bock, E., 673
Bouanchaud, D. H., 1038
Bouvier, F., 779
Boylen, Charles W., 584
Breton, Annick, 224
Brooks, David, 681
Brown, Paul R., 377
Burchard, Anne C., 666
Burchard, Robert P., 666
Burman, Lars G., 1
Burns, Donald J. W., 511, 520

Cacciapuoti, A. F., 555
Canale-Parola, E., 356
Cannon, G. C., 673
Cartledge, T. G., 426
Cartwright, Frank D., 144
Chambliss, Glenn H., 13
Champion, Alexander B., 1003
Chang, Annie C. Y., 734
Charlang, Gisela, 1042
Chatterjee, Arun K., 862
Chen, Gregory S., 747
Chopra, I., 411
Christian, Robin G., 841
Chu, Herman, 151
Clark, Alvin J., 784
Clark, Dan L., 186
Clark, David, 549
Cohen, Stanley N., 734
Cole, Roger M., 950
Conti, S. F., 628
Cronan, John E., Jr., 549

Dabernat, H. J., 1038
Dailey, H. A., Jr., 302
Daniels, L., 118
Dawson, Peter S. S., 36
Demain, Arnold L., 590
Donachie, W. D., 392
Doolittle, W. Ford, 771
Doonan, B. B., 967
Dowhan, William, 159
Drake, H. L., 132, 139
Duntze, Wolfgang, 28, 462
Dutt, Anuradha, 159

Eckhardt, Thomas, 60, 67
Eda, Tohru, 1024
Edlund, Thomas, 912
Egan, Rita M., 370
Evinger, Marian, 294

Farías, Ricardo N., 790
Fay, José P., 790
Fennewald, Michael, 614, 622
Fimmel, A. L., 757
Finkelstein, Mark, 884
Fisher, Susan H., 73
Freese, Ernst, 282
Frerman, F. E., 532
Fridovich, Irwin, 505
Fuchs, G., 118, 604
Fujita, Yasutaro, 282
Furano, Anthony V., 352

Gibson, Janet L., 818
Goodall, Adelina A., 426
Gottschalk, Gerhard, 764
Goulian, Mehran, 233
Greenberg, E. P., 356
Greenberg, Jerrold, 986
Gregoriou, Mary, 377
Grundström, Thomas, 912

Haber, James E., 180
Hadden, C. T., 847, 856
Hafner, Edmund W., 359, 832
Hakenbeck, Regine, 704
Haldenwang, William G., 151
Hall, Barry G., 219
Harada, Tokuya, 247
Hassan, H. Moustafa, 505
Hayaishi, Osamu, 363
Helmstetter, Charles E., 884
Henry, Susan A., 806
Hertz, R., 1034
Hirota, Yukinori, 308, 1045
Hofmann, Sandra, 718
Holmgren, Erik, 473
Horne, Diane, 704
Horodniceanu, Thea, 1038
Howe, T. G. B., 411
Huettner, Charles, 614

Iguma, Hatsumi, 784
Iino, T., 254
Iketani, Hiroko, 308
Inouye, Masayori, 308
Inouye, Sumiko, 308
Inselburg, Joseph, 321, 332
Irani, Meher H., 398
Ito, K., 254, 1021
Ito, Seiji, 363

Jacobson, Eric S., 747
Jensen, R. A., 896
Jensen, T. E., 967
Johnston, Gerald C., 723, 738
Jones, Barbara B., 270

Kadner, Robert J., 796
Kaji, Akira, 80, 90
Kanda, Yayoi, 1024
Kane, James F., 419
Kapoor, V., 385
Katze, Jon R., 174
Kelker, Norman, 67
Kelly, David L., 526
Kenealy, W., 604
Kenerley, Marian Ellwood, 931
Kenny, George E., 144
Kimura, Sadao, 1024
Kinsey, John A., 751
Kloetzel, John A., 666
Kobayashi, Hideki, 262
Kobayashi, Komei, 262
Kobayashi, Yasuo, 262
Kobilinsky, Lawrence, 113
Kolat, Anita I., 804
Kolenbrander, P. E., 51
Korn, David, 641
Kulla, Hans, 764

Lagenaur, Carl, 731
Lau, Reginald H., 771
Lee, C. H., 1031
Lee, Nancy, 308
Lefevre, J. C., 1038
Legault-Demare, Lucienne, 13
Lessie, T. G., 555
Lindahl, Lasse, 931
Lindgren, Viveka, 473
Lippincott, Barbara B., 824
Lippincott, James A., 824
Little, J. G., 1036
Loughlin, R. E., 757

Maas, Werner K., 740
McCusker, John H., 180
McElhaney, Ronald N., 485, 497
McEntee, Kevin, 904
McFarlane, E. Sandra, 723
MacKay, Vivian L., 462
MacKenzie, Margaret M., 771

McMichael, John C., 314
MacQueen, H. A., 392
Magasanik, Boris, 100, 106
Maitra, P. K., 398
Malone, Margaret M., 151
Maloney, Peter C., 564
Marchessault, R. H., 691
Margot, Jean B., 824
Martin, Juan F., 590
Maruo, Bunji, 127
Matsumura, P., 996
Matthew, Margaret, 341
Metzenberg, Robert L., 747
Mickelson, M. N., 541
Miller, Oscar L., Jr., 718
Mills, L. Bruce, 641
Morgan, Edward A., 931
Mori, Chizuru, 1024
Morrison, D. A., 349, 576
Mosteller, Raymond D., 174
Murooka, Yoshikatsu, 247
Murphy, Sandra D., 197

Nagaishi, Haruko, 784
Newman, E. B., 385
Newton, Auston, 1027
Nikaido, Hiroshi, 1045
Nishimura, Yukinobu, 308
Nomura, Masayasu, 127, 931
Nordin, J. H., 691
Normark, Staffan, 1, 912
Nunn, William D., 526

O'Brien, W. J., 532
Oertel, Wolfgang, 233
Ohnishi, Yoshinari, 784
Ohsawa, Hisao, 127
Ohta, Akinori, 434
Ono, Tsuneko, 784
Orlowski, Michael, 209
Ou, Jonathan T., 314
Owen, Peter, 974

Palchaudhuri, Sunil, 740
Paretsky, D., 841
Patel, N., 896
Phillips, Allen T., 370
Pierson, D. L., 896
Pittard, A. J., 453
Polacheck, I., 650
Popkin, Terry J., 950
Post, Leonard, 931
Potter, R., 385

Rabinowitz, Jesse C., 1003
Ramaley, Robert, 282
Reeve, Eric C. R., 219
Reeves, Peter, 23
Reiner, Albey M., 166
Revol, J. F., 691
Reznikoff, William S., 270
Richards, Charles S., 950
Ridgway, H. F., 657
Rose, A. H., 426
Rosenberger, R. F., 650
Rothstein, David M., 73
Roux, M., 691
Rownd, Robert H., 986
Rutberg, Lars, 473

St. Pierre, M., 896
Saito, Yuji, 485, 497
Salton, Milton R. J., 974
Sarma, Vimala, 23
Scherer, Carin G., 584
Sedwick, W. David, 641
Setlow, Barbara, 444, 744
Setlow, Jane K., 1048
Setlow, Peter, 444, 744
Shapiro, James, 614, 622
Shay, Luca K., 744
Sheffery, Michael, 1027
Shibuya, Isao, 434
Shiflett, M. A., 681
Shively, J. M., 673
Shizuta, Yutaka, 363
Sicard, N., 779
Silver, Scott A., 676
Silver, Simon, 186, 197
Silverman, M., 657, 996
Silvius, John R., 497
Simon, M. I., 657, 996
Simonian, Michael H., 174
Sinclair, Norval A., 676
Singer, Richard A., 723
Smith, John M., 870, 876
Sonenshein, Abraham L., 73
Stacey, Gary, 596
Stanbridge, Eric J., 185, 641
Starr, Mortimer P., 862
Stötzler, Dieter, 28
Straley, Susan C., 628
Stumfall, Michelle Y., 526
Surdin-Kerjan, Yolande, 224
Suzuki, Hideo, 308
Suzuki, T., 254
Sykes, R. B., 341
Sypherd, Paul S., 209

Tabita, F. Robert, 596, 818
Tabor, Celia White, 359, 832
Tabor, Herbert, 359, 832
Tanabe, Shizuo, 247
Tata, Renée, 377
Taylor, Dean P., 986
Thauer, R. K., 118, 604
Thomas, K. Chandapillai, 36
Thorner, Jeremy, 44
Tomasz, Alexander, 707

Umbarger, H. E., 870, 876

Van Baalen, Chase, 596
Vary, James C., 744
Vodkin, Michael, 346

Walker, James R., 151
Ware, Patricia, 321
Watanabe, Yasuyoshi, 363
Weinberger, M., 51
Weiss, Alison A., 186, 197
Westphal, K., 673
Whipp, Margaret J., 453
Wild, Jadwiga, 876
Williams, Norma P., 1042
Wittel, Frederick P., 352
Wolf-Watz, Hans, 912
Wu, Henry C., 308

Yall, Irving, 676
Yamada, Takashi, 247
Yamamori, T., 254
Yamamoto, Tatsuo, 80, 90
Yamamoto, Tatsuo, 923
Yamato, Masayuki, 127
Yokota, Takeshi, 80
Yokota, Takeshi, 923
Young, F. E., 681
Yui, Yoshiki, 363
Yura, T., 254

Zamir, L., 896
Zeikus, J. G., 118, 604
Żelazna-Kowalska, Irena, 8

SUBJECT INDEX

VOLUME 132

Acetanilide
  P. aeruginosa urea-resistant mutants, 377
Acetate production
  B. megaterium spore germination, 744
Acholeplasma laidlawii
  fatty acid biosynthesis, 497
  fatty acid incorporation, 485
  membrane lipid biosynthesis, 485, 497
Adenosine 3′,5′-monophosphate
  M. smegmatis, 1031
Adenosine 5′-monophosphate cleavage
  S. griseus, 590
Adenosine 5′-triphosphate synthesis
  proton entry, 564
  S. lactis, 564
S-Adenosylmethionine synthetase
  N. crassa, ethionine-resistant, 747
S-Adenosylmethionine synthetase, temperature-sensitive
  metK mutant, 832
Adenylate energy charge
  C. utilis cell cycle, 36
a-Factor
  S. cerevisiae, 462
Agrobacterium tumefaciens
  plasmid content, 824
  tumorigenicity, 824
Alkaline phosphatase
  P. boryanum, 967
Alkane hydroxylase activity
  P. putida, 614
alk regulon
  Pseudomonas, 622
Amidotransferase subunit
  B. subtilis, 419
Amino acid transport
  regulation in *E. coli*, 453
Ammonia assimilation
  Anabaena sp. strain CA, 596
Anabaena sp. strain CA
  glutamine synthetase, 596
Anacystis nidulans
  phycocyanin synthesis and degradation, 771
D-Arabitol toxicity
  E. coli phosphotransferases, 166
argA regulation
  E. coli, 67
argA transcription
  E. coli, 60
Arthrobacter
  2-hydroxypyridine metabolism, 51
  macromolecular synthesis in starved cells, 584
  pigment formation, 51
Arylsulfatase regulation
  immunological study, 247
  K. aerogenes, 247
Asparaginyl-transfer ribonucleic acid synthetase
  E. coli mutant, 127
Aspergillus awamori
  nigeran in hyphal walls, 691
Aspergillus nidulans
  cleistothecia, mutant lacking, 650
  α-(1,3)-glucan, mutant lacking, 650
  melanin, mutant lacking, 650
Aspergillus niger
  nigeran in hyphal walls, 691

Bacteriophage, female-specific
  E. coli F plasmid genes, 740
Bacteriophage λ *argA-lac*
  argA transcription in *E. coli*, 60
Bacteriophage Mu mutagenesis
  increasing frequency of specific mutants, 359
Bdellovibrio bacteriovorus
  chemotaxis toward prey, 628
Beta-lactamase
  Pseudomonas plasmid RPL11, 341
Beta-lactamase hyperproduction
  E. coli mutants, 912
Beta-oxidation enzyme complex
  E. coli, 532
Bisulfite reductase
  D. vulgaris, 139
Blue-green bacterium
  A. nidulans phycocyanin synthesis, 771
Budding
  S. cerevisiae, starved, 738
Bulinus jousseaumei
  bacterial infection, 950
B_{12} uptake
  E. coli, 796
Bacillus subtilis
  amidotransferase subunit, 419
  DNA repair and fragmentation, 856
  fusidic acid-resistant mutants, 262
  glucose dehydrogenase, 282
  lipiarmycin resistance, 73
  lipid secretion, 704
  peptidoglycan synthesis, 704
  phosphatidylethanolamine synthesis in mutant, 473
  restriction in transformation, 847
  sporulation, 13
  temperature shift, 681
  transformation, 847
  translational system, 13
Bacillus megaterium
  acetate production during spore germination, 744
  coenzyme A, 444
  spore germination, 744

Candida utilis
  adenylate energy charge, 36
  phased growth, 36
Carbon monoxide oxidation
  methanogenic bacteria, 118
Carboxysomes

N. agilis, 673
Caulobacter crescentus
flagellar filaments, 1027
nucleoid, 294
Caulobacter flagellins, 731
Cell carbon synthesis
M. thermoautotrophicum oxidoreductase, 604
Cell cycle analysis
E. coli F'*lac* replication, 884
Cell division
S. cerevisiae, nitrogen-starved, 723
che and *mot* gene products
E. coli, 996
Chemotaxis
E. coli, 657
protein control, 657
Chemotaxis toward prey
B. bacteriovorus, 628
Citrate lyase inactivation
E. aerogenes, 764
Cleistothecia
A. nidulans mutant, 650
Clostridium acidiurici
ferredoxin, 1003
formyltetrahydrofolate synthetase, 1003
Clostridium cylindrosporum
ferredoxin, 1003
formyltetrahydrofolate synthetase, 1003
Clostridium pasteurianum
CO oxidation, 118
Coenzyme A
B. megaterium spores and cells, 444
ColE1 hybrid plasmids in minicells
mot and *che* gene products, 996
ColE1 hybrid plasmids with ribosomal ribonucleic acid genes, 996
Colicin E1 plasmids
deletion mutants, 321
Coxiella burnetii
ribonucleotide synthesis, 841
RNA synthesis, 841
Cryogenic preservation
E. coli, 349
Cyanobacteria
ammonia assimilation, 596
nitrogen assimilation, 596
Cyanocobalamin uptake
E. coli, 796
Cyclic adenosine 3',5'-monophosphate
E. coli, 80
Rts1 effects, requirement for, 80
cys-specific messenger ribonucleic acid
E. coli, 757
phage λ, 757
Cysteine messenger ribonucleic acid
E. coli, 757
phage λ, 757

Deletion mutants
colicin E1 plasmids, 321
Deoxyribonucleic acid
B. subtilis, 856
pneumococcal eclipse complex, 576
recA B. subtilis, 856
repair and fragmentation in *recA B. subtilis*, 856
Deoxyribonucleic acid polymerase
Mycoplasmatales, 641
Deoxyribonucleic acid replication
blocked replicon, 392
E. coli, 392
Rts1, 90
Deoxyribonucleic acid synthesis
S. cerevisiae spheroplasts, 233
Derepression of amino acid biosynthetic enzymes
E. coli, 352
pathway derepression, 352
Desulfovibrio vulgaris
bisulfide reductase, 139
thiosulfate-forming enzyme, 132
Dictyostelium discoideum
respiratory competence of spores, 113
[^{3}H]dihydrostreptomycin accumulation and binding
Rhizobium mutants, 8
dnaZ(Ts) mutant
E. coli, 151
physiology, 151
Donor strains of *Erwinia chrysanthemi*, 862

Eclipse complex
pneumococcus, 576
Electron transport
E. coli flagellum formation, 1034
Enterobacter aerogenes
citrate lyase inactivation, 764
phospholipid metabolism, 159
Enterobacter cloacae
R plasmid pJY5 replication, 923
Erwinia chrysanthemi
donor strains, 862
pectolytic capacity, 862
Escherichia coli
S-adenosylmethionine synthetase in *metK* mutant, 832
amino acid transport regulation, 453
D-arabitol toxicity, 166
argA regulation, 67
argA transcription, 60
asparaginyl-tRNA synthetase mutant, 127
B_{12} uptake, 796
cAMP requirement for effects of Rts1, 80
cell cycle analysis of F'*lac* replication, 884
che and *mot* gene products, 996
chemotaxis, 657
ColE1 hybrid plasmids with rRNA genes, 931
cryogenic preservation, 349
cyanocobalamin uptake, 796
cys-specific mRNA, 757
derepression, 352
dnaB dnaG double mutants, 779
dnaB mutants, 779
dnaZ(Ts) mutant, 151
electron transport and flagellum formation, 1034
fabB, *fabC*, 549
fatty acid, inhibitory action of, 790
fatty acid synthesis, 526
female-specific phages, inhibition of growth of, 740
F'*lac* replication, 884
flagellum formation, 254
flagellum formation and electron transport, 1034
F plasmid genes, 740

F plasmid gene *srnB*$^+$, 784
β-galactosidase synthesis, 67, 876
glycolysis mutants, 398
gpsA, 549
HfrH-type donor cell formation, 1038
hyperproduction of β-lactamase, 912
ilvC-lac fusion, 870
β-lactamase hyperproduction, 912
β-lactamase mutations, 1
λ*dcys* transducing phage, 757
lipid mutants, 549
lipoprotein-deficient mutants, 1045
lipoprotein, mutant, 308
lysozyme treatment, 411
membrane lipid biosynthetic genes, 549
metal ion dependence of protein, 314
metK mutant, 832
miniplasmids, 986
mot and *che* gene products, 996
motility, 657
mRNA, 757
nitrogen metabolism, 385
NR1 copy mutants, 986
nucleoside Q formation, 174
ompB, 23
outer membrane, 308, 411, 790, 1045
outer-membrane protein, 23
β-oxidation enzyme complex, 532
penicillin resistance, 1
phospholipid biosynthesis, 526
phospholipid synthesis in *pss* mutants, 434
phosphotransferase derepression, 166
plasmid DNA replication, 392
plasmid pSC101, origin of, 734
plasmid Rts1 thermosensitive effects, 80
plsB, 549
protease inhibitor effects on protein synthesis, 1021
protein I aggregate in outer membrane, 411
proteins controlling motility and chemotaxis, 657
protein synthesis and protease inhibitor, 1021
pSC101 plasmid, origin of, 734
pss mutant, 434
replicon, blocked, 392
RNA degradation, 784
RNA polymerase and flagellum formation, 254
rRNA synthesis in RNase III-deficient strain, 718
rRNA transcription units, 931
Rts1 DNA replication, 90
srl region, 904
srnB$^+$, 784
superoxide dismutase synthesis, 505
threonine deaminase synthesis, 363
threonine dehydratase induction, 370
threonine dehydrogenase and nitrogen metabolism, 385
thymineless death, 779
transformation, 349
transmembrane diffusion, 1045
tRNA, 174
xylitol toxicity, 166

fabB, *fabC*
E. coli, 549
Fatty acid incorporation
A. laidlawii, 485
Fatty acids
E. coli inhibition, 790
outer membrane integrity, 790
Fatty acid synthesis
A. laidlawii, 497
E. coli phospholipid biosynthesis, 526
Female-specific bacteriophages
E. coli F plasmid genes, 740
Ferredoxin
C. acidiurici, 1003
C. cylindrosporum, 1003
uric acid-fermenting strains, 1003
Ferrochelatase
S. itersonii, 302
F′*lac* replication
cell cycle analysis, 884
E. coli, 884
Flagellar filaments
C. crescentus, 1027
Flagellins
Caulobacter, 731
Flagellum formation
E. coli, 254, 1034
electron transport, 1034
RNA polymerase, 254
Formyltetrahydrofolate synthetase
C. acidiurici, 1003
C. cylindrosporum, 1003
uric acid-fermenting strains, 1003
F plasmid genes
E. coli, 740
female-specific phages, inhibition of growth of, 740
F plasmid gene *srnB*$^+$
E. coli, 784
RNA degradation, 784
Fusidic acid-resistant sporulation mutants
B. subtilis, 262

Beta-galactosidase
Klebsiella, 219
Beta-galactosidase synthesis
argA control, 67
E. coli, 67, 876
ilv-lac fusion DNA as template, 876
α-(1,3)-Glucan
A. nidulans mutant, 650
Glucose dehydrogenase
B. subtilis, 282
Glucose effect
superoxide dismutase synthesis in *E. coli*, 505
Glucose 6-phosphate dehydrogenase
P. cepacia, 555
Glucose transport
inhibition by lactoperoxidase-thiocyanate-hydrogen peroxide, 541
S. agalactiae, 541
Glutamate dehydrogenase
Neurospora mutants, 751
Glutamine synthetase
Anabaena sp. strain CA, 596
K. aerogenes 100, 106
Glycolysis
E. coli mutants, 398
gpsA
E. coli, 549

Growth temperature, maximum
L. stokesii, 676
molecular basis for, 676

Haemophilus influenzae
defective prophage, 1048
heat sensitivity, 1048
Heat sensitivity
H. influenzae containing defective prophage, 1048
HfrH-type donor cell formation
E. coli, 1038
integrative suppression by R-F recombinant plasmids, 1038
Hind II + III restriction enzyme analysis
tryptophan-transducing phages, 270
2-Hydroxypyridine metabolism
Arthrobacter species, 51
Hyperproduction of β-lactamase
E. coli mutants, 912

Icosahedral inclusions
N. agilis, 673
ilvC-lac fusion
E. coli, 870
ilv-lac fusion deoxyribonucleic acid
β-galactosidase, 876
Inositol-starved yeast spheroplasts
osmotic imbalance, 806
Integrative suppression
HfrH-type donor cell formation, 1038

Killer factor mutations
S. cerevisiae, 346
Klebsiella
β-galactosidase, 219
Klebsiella aerogenes
arylsulfatase regulation, immunological study of, 247
glutamine synthetase, 100, 106

Beta-lactamase mutations
E. coli penicillin resistance, 1
Lactoperoxidase-thiocyanate-hydrogen peroxide
S. agalactiae glucose transport, 541
Leucosporidium stokesii
basis for maximum growth temperature, 676
Lipiarmycin resistance
B. subtilis RNA polymerase mutants, 73
Lipid biosynthesis
A. laidlawii membrane, 485, 497
Lipid biosynthetic genes
E. coli, 549
fabB, 549
fabC, 549
gpsA, 549
plsB, 549
Lipid secretion
B. subtilis, 704
peptidoglycan synthesis, 704
S. epidermidis, 704
streptococci, 704
Lipoprotein, mutant
E. coli outer membrane, 308
Lysozyme-promoted association of protein I molecules
E. coli outer membrane, 411

Macromolecular synthesis
Arthrobacter, starved, 584
Maximum growth temperature
L. stokesii, 676
molecular basis for, 676
Melanin
A. nidulans mutant, 650
Membrane asymmetry and surface antigens
M. lysodeikticus, 974
Membrane lipid biosynthesis
A. laidlawii, 485, 497
Membrane lipid biosynthetic genes
E. coli, 549
fabB, 549
fabC, 549
gpsA, 549
plsB, 549
Mercury resistance
Pseudomonas plasmids, 186
S. aureus plasmids, 197
Messenger ribonucleic acid
E. coli, 757
phage lambda, 757
Metal ion dependence
E. coli protein, 314
Methanobacterium arbophilicum
CO oxidation, 118
Methanobacterium formicicum
CO oxidation, 118
Methanobacterium ruminantium
CO oxidation, 118
Methanobacterium thermoautotrophicum
CO oxidation, 118
oxidoreductases, 604
Methanosarcina barkeri
CO oxidation, 118
Methionine
nucleoside Q formation, 174
metK mutant
E. coli, 832
S-adenosylmethionine synthetase, temperature-sensitive, 832
Micrococcus cerificans
phospholipid metabolism, 159
Micrococcus lysodeikticus
membrane asymmetry and surface antigen, 974
Microtubular structures
staphyloccal L-form, 1024
Minicells
ColE1 hybrid plasmids in, 996
Miniplasmids
NR1 copy mutants, 986
mot and *che* gene products
E. coli, 996
Motility
E. coli, 657
flagellated bacteria in viscous environments, 356
protein control, 657
Mucor racemosus
protein synthesis during morphogenesis, 209
Mutagenesis with bacteriophage Mu
increasing frequency of specific mutants, 359
Mycobacterium smegmatis
cAMP, 1031
Mycoplasmatales
DNA polymerase, 641

Myxococcus xanthus
periodic structures, 666

Neurospora
glutamate dehydrogenase mutants, 751
Neurospora crassa
S-adenosylmethionine synthetase, 747
phosphate uptake, 511, 520
pretyrosine, 896
siderophore, mutant that responds to, 1042
Nigeran
Aspergillus walls, 691
Nitrobacter agilis
icosahedral inclusions (carboxysomes), 673
Nitrogen assimilation
Anabaena sp. strain CA, 596
Nitrogen metabolism
E. coli, 385
threonine dehydrogenase, 385
Nitrogen starvation
S. cerevisiae, 723, 738
NR1
miniplasmids, 986
Nucleoid
C. crescentus, 294
Nucleoside Q formation
E. coli tRNA, 174
methionine role, 174

Oligopeptides
yeast mating hormone activity, 28
ompB
E. coli outer-membrane protein, 23
Organomercurial resistance
Pseudomonas plasmids, 186
S. aureus plasmids, 197
Outer membrane
E. coli, 308, 411, 790
fatty acids, 790
gram-negative bacteria, 1045
lipoprotein, mutant, 308
lysozyme treatment, 411
protein I aggregate, 411
Outer membrane protein
E. coli, 23
ampB, 23
Oxidoreductase
M. thermoautotrophicum cell carbon synthesis, 604

Pectolytic capacity
E. chrysanthemi, 862
Penicillin resistance
E. coli, 1
β-lactamase mutations, 1
Peptidoglycan synthesis
B. subtilis, 704
lipid secretion, 704
S. epidermidis, 704
streptococci, 704
Periodic structures
M. xanthus, 666
pH
S. cerevisiae sporulation, 180
Phased growth
C. utilis, 36
Phosphate uptake
N. crassa, 511, 520
Phosphatidylethanolamine synthesis
B. subtilis mutant, 473
Phospholipid biosynthesis
fatty acid synthesis in *E. coli*, 526
Phospholipid metabolism
E. aerogenes, 159
M. cerificans, 159
S. marcescens, 159
S. typhimurium, 159
Phospholipid synthesis
E. coli pss mutant, 434
Phosphotransferase derepression
E. coli, 166
Phycocyanin synthesis and degradation
A. nidulans, 771
Pigment formation
Arthrobacter species, 51
Plasmid alkane hydroxylase
P. putida, 614
Plasmid *alk* regulon
Pseudomonas, 622
Plasmid content
A. tumefaciens, 824
Plasmid pJY5
E. cloacae, 923
replication, 923
Plasmid pSC101
E. coli, 734
origin, revised interpretation of, 734
Plasmid Rts1
cAMP requirement for effects of, 80
DNA replication, 90
E. coli, 90
E. coli mutant, 80
Plasmids
ColE1 hybrids in minicells, 996
E. coli, 392
localization of a blocked replicon, 392
mercury and organomercurial resistances of *Pseudomonas* and *S. aureus*, 186, 197
Plectonema boryanum
alkaline phosphatase, 967
plsB
E. coli, 549
Pneumococcus
DNA eclipse complex, 576
transformation, 576
Pretyrosine
N. crassa, 896
Prophage
H. influenzae heat sensitivity, 1048
Protease inhibitor
E. coli protein synthesis, 1021
Protein I aggregate
E. coli outer membrane, 411
Proteins controlling motility and chemotaxis
E. coli, 657
Protein synthesis
E. coli, 1021
M. racemosus morphogenesis, 209
protease inhibitor, 1021
Proton entry
ATP synthesis in *S. lactis*, 564

Pseudomonas
mercury and organomercurial resistances, 186
plasmid *alk* regulon, 622
Pseudomonas aeruginosa
acetanilide, growth on, 377
urea-resistant mutants, 377
Pseudomonas cepacia
glucose 6-phosphate dehydrogenase, 555
Pseudomonas plasmid RPL11
β-lactamase, 341
Pseudomonas putida
alkane hydroxylase activity, 614
plasmid alkane hydroxylase, 614
pss mutant
E. coli, 434

Regulon *alk*
Pseudomonas, 622
Replicon, blocked
localization, 392
Respiratory competence
D. discoideum spores, 113
Restriction
B. subtilis transformation, 847
Rhizobium trifolii
[^{3}H]dihydrostreptomycin accumulation and binding, 8
Rhodopseudomonas capsulata
ribulose 1,5-bisphosphate carboxylase, 818
Ribonucleic acid degradation
E. coli, 784
srnB$^+$, 784
Ribonucleic acid polymerase
B. subtilis, 73
E. coli flagellum formation, 254
lipiarmycin-resistant *B. subtilis*, 73
Ribonucleic acid synthesis
C. burnetii ribonucleotides, 841
Ribonucleotide synthesis
C. burnetii, 841
Ribosomal ribonucleic acid synthesis
RNase III-deficient *E. coli*, 718
Ribosomal ribonucleic acid transcription units
E. coli, 931
hybrid plasmids, 931
Ribulose 1,5-bisphosphate carboxylase
R. capsulata, 818
R plasmid NR1
miniplasmids, 986
R plasmid pJY5
E. cloacae, 923
replication, 923

Saccharomyces cerevisiae
a-factor, 462
auxotroph selection by thymidylate starvation, 1036
budding during starvation, 738
inositol-starved spheroplasts, 806
killer factor mutations, 346
mating hormone activity, stimulation of, 28
nitrogen starvation, 723, 738
oligopeptides, synthetic, 28
sporulation in pH 6 buffered media, 180
starvation, 738
sulfate uptake, 224
TMP-requiring mutants are deficient in thymidylate synthetase, 44
vesicles, 426
Saccharomyces cerevisiae spheroplasts
DNA synthesis, 233
Salmonella typhimurium
phospholipid metabolism, 159
Serratia marcescens
phospholipid metabolism, 159
Siderophores
N. crassa mutant, 1042
Snail
bacterial infection, 950
Spirillum intersonii
ferrochelatase, 302
Spore germination
acetate production, 744
B. megaterium, 744
Sporulation
B. subtilis translational system, 13
S. cerevisiae, 180
srl region
E. coli, 904
srnB$^+$
E. coli F plasmid, 784
mapping, 784
RNA degradation, 784
Staphylococcal L-form
microtubular structures, 1024
Staphylococcus aureus
mercury and organomercurial resistances, 197
Staphylococcus epidermidis
lipid secretion, 704
peptidoglycan synthesis, 704
Starvation
S. cerevisiae, 738
str^r
R. trifolii, 8
Streptococci
lipid secretion, 704
peptidoglycan synthesis, 704
Streptococcus agalactiae
glucose transport, 541
lactoperoxidase-thiocyanate-hydrogen peroxide treatment, 541
Streptococcus lactis
proton entry coupled to ATP synthesis, 564
Streptomyces griseus
AMP cleavage, 590
Streptomycin resistance
R. trifolii, 8
Sulfate uptake
S. cerevisiae, 224
Superoxide dismutase synthesis
E. coli, 505
glucose effect, 505
Surface antigens and membrane asymmetry
M. lysodeikticus, 974

Temperature shift
B. subtilis mutants, 681
Thiosulfate-forming enzyme
D. vulgaris, 132
Threonine deaminase synthesis
E. coli, 363

Threonine dehydratase
E. coli, 370
Threonine dehydrogenase
E. coli nitrogen metabolism, 385
Thymidine 5′-monophosphate-requiring mutants
S. cerevisiae, 44
Thymidylate synthetase activity
S. cerevisiae, 44
Thymidylate starvation
yeast auxotroph selection, 1036
Thymineless death
E. coli mutants, 779
Transcription
argA, 60
E. coli, 60
λ *argA-lac* phages, 60
Transfer ribonucleic acid
E. coli, 174
nucleoside Q, 174
Transformation
B. subtilis recA, 847
cryogenic preservation, 349
E. coli, 349
restriction-like phenomena, 847
Translational system
B. subtilis sporulation, 13
Transmembrane diffusion
E. coli mutants, 1045
Tryptophan-transducing bacteriophages, 270
Tumorigenicity
A. tumefaciens, 824

Ureaplasma urealyticum
urea requirement, 144
Urea-resistant mutants
P. aeruginosa grown on acetanilide, 377
Uric acid fermenters
ferredoxin, 1045
formyltetrahydrofolate, 1045

Vesicles
S. cerevisiae, 426
Viscous environments
motility of flagellated bacteria, 356

Yeast
auxotroph selection by thymidylate starvation, 1036
inositol-starved spheroplasts, 806
Yeast killer factor mutations
induction, 346
Yeast mating hormone activity
stimulation by synthetic oligopeptides, 28

Xylitol toxicity
E. coli phosphotransferases, 166

INDEX TO DATE OF ISSUE

Month	Date of Issue	Pages
October	11 October 1977	1–359
November	8 November 1977	363–749
December	2 December 1977	751–1050